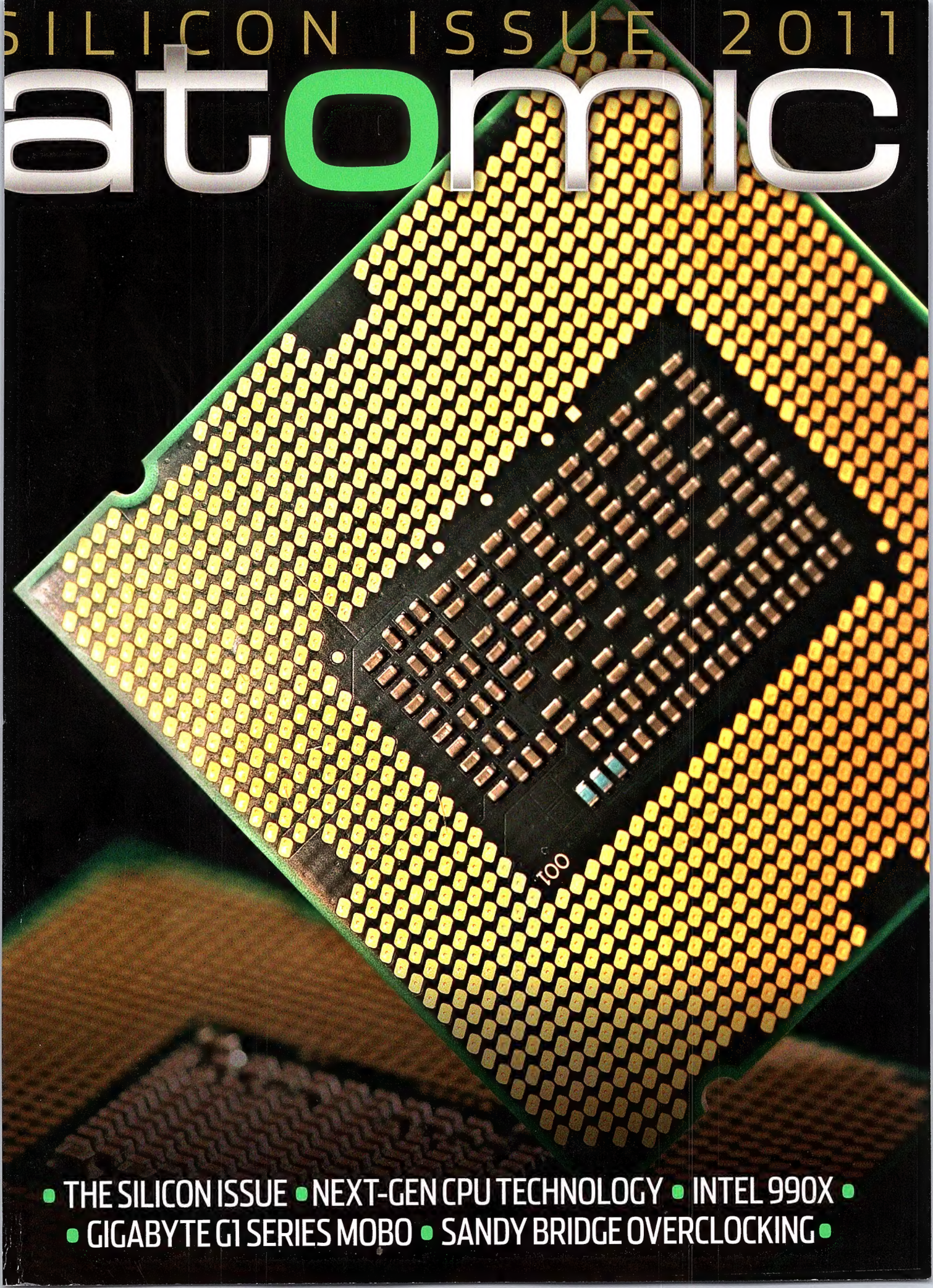
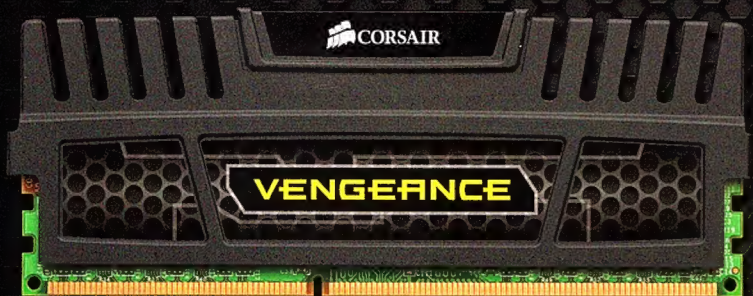


SILICON ISSUE 2011 atomic



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EDHEAD

This time for sure

Thank the tech Gods that's over.

The last couple of months have been an awkward time for lovers of PCs and cutting edge tech. Intel messed up its Sandy Bridge launch big time, costing itself and likely the industry at large billions of dollars.

Not to mention, letting down folks like us who were looking forward to an awesome new chip to fiddle with!

However, by the time you read this

everything should be getting back onto an even keel. New motherboards should be flowing into stores, and the expected bonanza of upgrading and system building can get back on track. With that in mind, we've gone totally silicon mad this issue.

This month, it's all about the chip. We've got overclocking guides just in time for Sandy Bridge's better late than never arrival, a full review of Intel's newest six-core i7, GIGABYTE's sexy new X58 mobo, and a crystal-ball powered look into the future of CPUs.

We're calling it our Silicon Issue - kind of like a swimsuit issue for lovers of tech. And on top of the silicon love (wait, that came out wrong...), we've got some of the hottest game releases of the year, the first part of a home automation tutorial, and an array of previews and reviews to get your wallet nervous.

Fun times...

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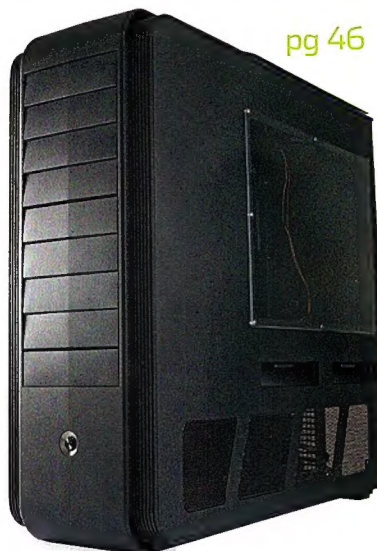
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Gametradars asks parents to think of the children

As the R18+ debate looks set to heat up again, this retailer offers some sensible thoughts on the issue of violence in games.

Gametradars may well have a vested interest in the R18+ gaming debate, but that doesn't stop us from agreeing wholeheartedly with their latest release on the issue, in which they point to research that suggests that games do not make children more violent and that it should be the responsibility of parents to protect their kids from exposure to excessive or inappropriate violence.

They've also suggested four things that parents can do to take back control over their kids gaming, including:

- Checking game classification is appropriate before buying.
- Utilising parental controls on gaming consoles.
- Ensuring kids play games across a variety of genres, so they don't get too into any one style of gaming.
- Ensure and encourage moderation, by keeping track of what kids are playing and for how long, and playing 'an active role in their entertainment choices'.

That all sounds simple and sensible to us. The Gametradars release goes on to

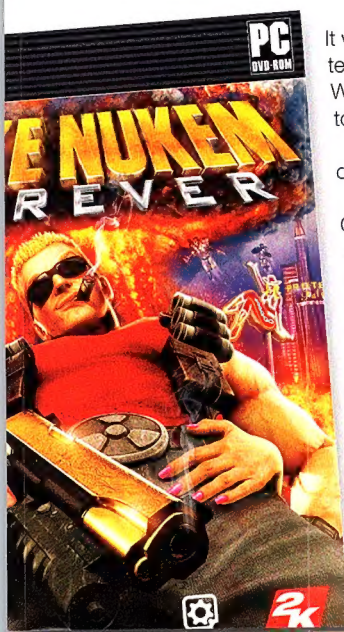
remind us that years of research on whether violent games cause violent children has been 'widely inconclusive', and points to reports that conclude that violent games on their own don't cause a child to become violent without other contributing factors. In fact, a number of recent studies 'have concluded that it is not the video games causing violence or aggression in children, but it is the children themselves,' says Rob Jenkins, Gametradars' National Marketing Manager. Jenkins goes on to state that 'a lack of supervision and control by parents over the type of game and duration of play' also contribute.

Of course, some parents will argue that they can't control what their kids play outside the house or watch them every minute, and that's fair enough, but – if we may editorialise – that shouldn't stop them doing what they can, when they can.

As it looks more and more likely that a decision on an R18+ rating for games will be made in July, one way or the other, we expect to be hearing more and more from groups on both sides of the debate in the months to come. We just hope most of what we hear is as sensible as this.

Duke Nukem's delayed again? Really?

Is anyone actually surprised about another Duke Nukem Forever delay? Are there even any more jokes to be made at the game's expense?



It was just the other week that a local PR rep over at 2K Games was telling me that Duke Nukem Forever was on track for a May release. Whoops! News out of 2K is that the game has now slipped one month to a June release date.

Poor planning, or PR stunt? Whatever it is, the dick jokes are already overloading.

"In case you haven't heard, Duke never comes early," said Christoph Hartmann, president of 2K. "We're committed to deliver a laugh-out-loud, politically incorrect experience that people will talk about for years to come. We thank Duke's fans for their continued patience – I promise this won't take another 15 years."

Regardless, while we were having this conversation I was playing through the opening chapters of the game, at a hands-on preview session. And our thoughts?

Well, let's just say we're not heartbroken over the delay. We're sure a lot of folks are going to enjoy the game just out of a sense of completion, but we were kinda lost after the first poo-sliding episode. 'Nuff said.

atomic
MAXIMUM POWER COMPUTING

FROM ATOMIC ONLINE

It's that wonderful time again where we come together to shower the best posters of the month with praise - and even the odd prize! It's a special time, even a happy time, so I'm sure you'll join me in congratulating our winner... And that is...

aliali!

<http://forums.atomicmpc.com.au/index.php?showtopic=40572&st=0&p=813578&#entry813578>

Comprised of both the community spirit to help as well as technical goodness, aliali gets the win, and some sweet Razer gear to boot!

And of course there are runners up, full of almost as much awesome.

The Fuzz Damn You

<http://forums.atomicmpc.com.au/index.php?showtopic=41104&st=0&p=825109&#entry825109>

Great post, and a handsome devil to boot.

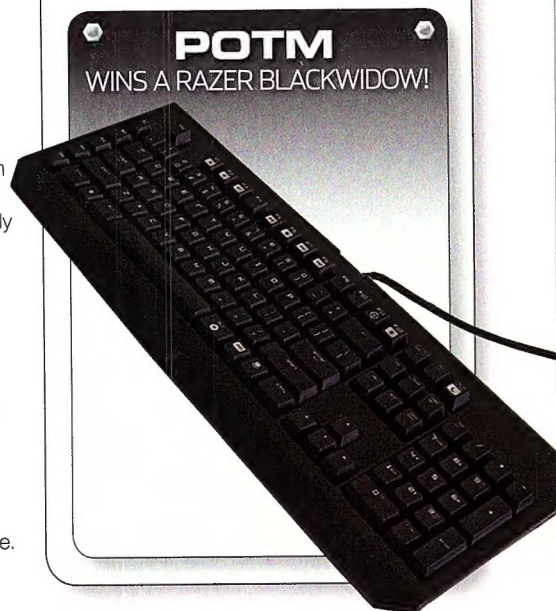
Bundy 2.0

<http://forums.atomicmpc.com.au/index.php?showtopic=40624>
Games and philosophy FTW.

mark84

<http://forums.atomicmpc.com.au/index.php?showtopic=40384>

Showing his support for the forums and the community with a great idea.



MODIFICATION

with Ashton "One Mod To Rule Them All" Mills

Fistful of Frags

Game Half Life 2

URL www.fistful-of-frags.com

Lamenting the lack of Red Dead Redemption for the PC? While this isn't exactly the same, per se, it does cover the most pertinent facets: wild west setting, fat-ass horses, bad-ass cowboys and shooting people with period weaponry. As you do.


Oh, and hats. This mod has hats. Cowboy hats and Desperado hats and hats of other kinds. Hats. What more could you want (apart from more hats)?

It also features various gameplay modes, from Fistful of Dollars (fast-paced team vs team) to Train Robbery (which is a blast on a moving train), Deathmatch and even missions for co-op play.

There's a huge range of classic weaponry including the Colt Navy, Smith carbine, and Winchester pump shotgun to bows and arrows and good old fisticuffs.

Weapons are bought with notoriety – the more notorious you become, the more powerful weapons you can use. For those two-handed bad-asses, there are 36 different combinations of dual-wielding pistol gunholio fun. That's me by the way. I love dual-wield. That's why I always play Rangers. I digress.

Back to shooting people! Fistful of Frags also allows you to spend notoriety to personalise your character, from chewing tobacco to boot spurs, each item of which grants benefits too (like increased health, or faster running). There's a medic class too, Whisky Man, and you know what elixir of health he's delivering. Other classes include Sharpshooter, Miner, Bounty Hunter, Stagecoach Driver and, er, Axe Murderer.

The download is a measly 500M so you've got no excuse not to don your boots, spurs, pistols, backup knife and, of course, your hat. Don't forget the hat. Hats are awesome. 



Bisounours Party

Game Half Life 2

URL www.moddb.com/mods/bisounours-party



Because they can. That's the answer, but what's the question? Probably something along the lines of "Why on *Earth* would you make a mod like this?"

That, and it's a refreshing change. Very refreshing really – look at the screenshots. It is underneath another deathmatch, capture the flag, Sourceforts kinda game but in a rather less serious game world. It kinda looks like Barney the Dinosaur barfed into an alternate dimension and this is what came out. And it's all about cute cuddly bears running around and blowing each other up.

What could be more endearing than running

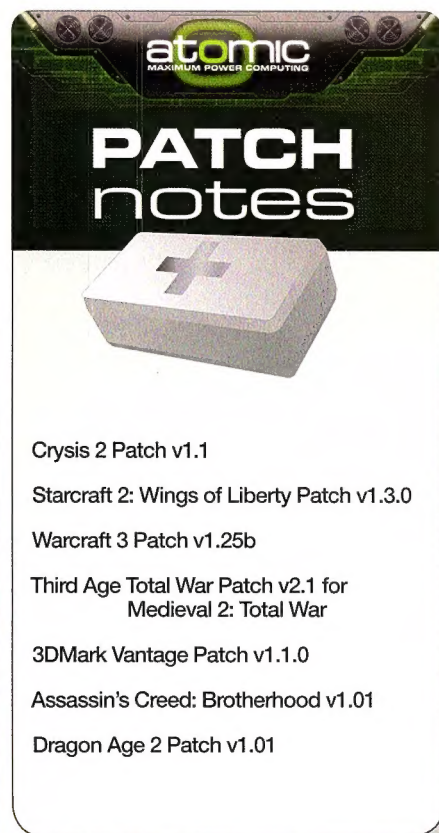
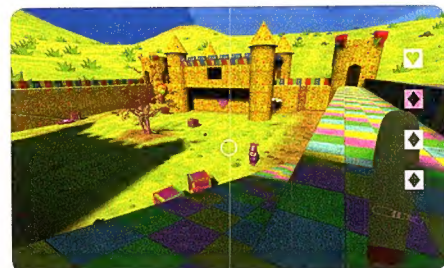
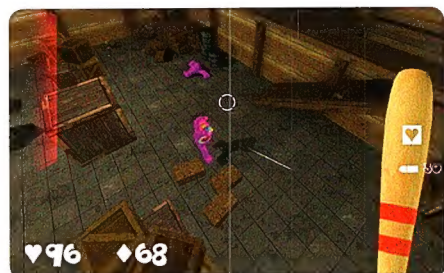
around as a giant green Care Bear equipped with a rocket launcher? Oh yeah, that's stuff little girl's dreams are made of.

But Bisounours goes out of its way to be offensive in all the best ways. Bears with the Russian scythe and hammer on their nose, flowers that act like axes, healing with bongos and vodka, and the employment of internet memes like Awesome Smiley rockets and... (you'd have to expect this) the Pedobear.

The bad taste extends to the maps too, with names like co_munist and another level that is

set in a marijuana factory!

Bisounours is still in beta, but is perfectly playable. Some of the sounds and animations are still hold overs from Half Life 2, but this will likely be ironed out as the game approaches final release. But don't let this stop you; mods like this can be years in development and are fully playable in the meantime. Of course, that's assuming you *want* to go frolicking in the colourful, psychedelic environment that Bisounours brings to the party (yeah, you saw what I did there). (P)



Crysis 2 Patch v1.1

Starcraft 2: Wings of Liberty Patch v1.3.0

Warcraft 3 Patch v1.25b

Third Age Total War Patch v2.1 for
Medieval 2: Total War

3DMark Vantage Patch v1.1.0

Assassin's Creed: Brotherhood v1.01

Dragon Age 2 Patch v1.01

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Thecus N3200XXX

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Website: www.thecus.com

The humble NAS system has come a long way. Gone are the days of the grey or black box with a light at the top; instead the Thecus XXX series seems to be basing it's styling itself on Ye Olde Hi-Fi Micro-system of the mid-90s. If we squint, we can almost see the tape deck and the am/fm tuner, as well as the newfangled CD player. Add a little blue display panel and it's almost like the last 15 years never happened.

Except they did, of course, which is why we can have NAS system that looks like a micro-system at all – nevermind ones with Intel Atom processors, a gigabyte of RAM and a bunch of SATA ports. Who would have imagined of all that stuff in the mid 90s?



Belkin Conserve Valet

Price: \$39.95

Website: www.belkin.com

Now, we could get all political and serious on you and start talking about global warming and carbon and all of that stuff, or we could just tell you that electricity costs money, will probably always cost money and probably more and more money as time goes on, and so saving electricity has to be a good thing, if only for your wallet. Hence: the Belkin Conserve Valet.

It's not the most exciting product to have ever landed on our desks, but it does have its use: namely, charging up all your mobile devices from one handy hub. And not just any hub, but one that keeps all your cables tidy, and switches off automatically when everything's charged. So that's a neatness-win and a wallet-win, all in one.



Neon Genesis Zwart

Price: LOTS

Website: www.lightair.co.jp/works/eva/

Now, we know there probably aren't all that many surfers reading Atomic, but there might be a couple. Which is actually irrelevant, because these wetsuits transcend surfing. Sure, you'll look totally at home in the water, riding waves and declaring things 'gnarly' – while staying toasty warm and highly visible from the coastline, should you get in trouble – but you'll also look brilliant in one of these things doing your shopping, or sitting around the house, or working. In fact, wearing one of these at any time will turn you into the totally awesome being you've always wanted to be.

At least in our minds, and the minds of your fellow geeks.



Velodyne Digital Drive Plus Subwoofer

Price: \$4,990

Website: www.velodyne.com

Ok, we'll admit it: we'll probably never be in a position to spend most of a five-thousand-dollar note on a subwoofer. It's not that we don't like subwoofers – because we do, but mostly we just like saying the word – it's that, well, we're journalists. And also, if we had five thousand dollars to spend on a subwoofer, we'd want to have an equally impressive amount to spend on the rest of our speaker set-up, and then we'd be both broke and really pissing off the people in the shoeboxes around ours.

That said, the numbers that accompany the Digital Drive Plus do impress us. 3000-watts of dynamic power. Magnet structures starting at 35lbs. Six-layer voice coils. It all just sounds big and noisy and fun, and we like big noisy fun.

We just don't so much love the price, sadly. Sigh.

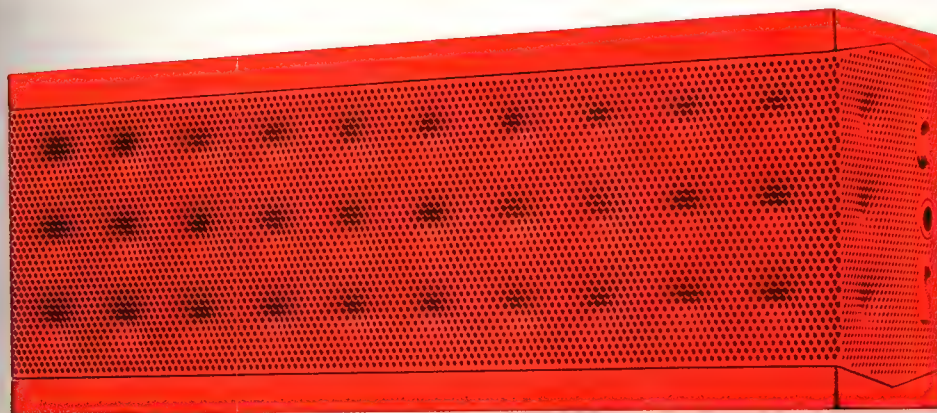
FortuneTech NA-220A

Price: TBC Website: www.fortunetec.com.au

It's a sad fact of life that as laptops get smaller and thinner and lighter – they also get a hell of a lot less functional. They don't just give up screen real-estate, they also sacrifice optical drives and connectivity ports and all the other stuff that helps them play nice with all your other bits and pieces.

One of the first things to go was the humble PCI Express port, and while the majority of people out there will never even notice that it's gone, we're Atomicans.

Enter the FortuneTech NA-220A. It's an external PCI Express Card slot, which works in much the same way as any other external drive would: giving you access to something that your laptop manufacturer decided for you that you didn't need. Stick it to them, people.



Jawbone Jambox

Price: \$249

Website: www.jawbone.com

Ah, portable speakers. They're such a tricky beast. Too often, they focus is on looking cute and whimsical while sounding like you've wrapped your regular sound system in tinfoil, and then a blanket. A wet one.

The Jambox swears it's different. For a start, it prides itself on looking kind of rugged and cool. It is also the only compact portable speaker to feature something called a 'moving-wall passive bass radiator and airtight enclosure' which allows it to sound like, well, a proper speaker.

It also works with your mobile talking device as a speaker, so you can set one up on your desk for a bit of a Charlie's Angels experience. If you have angels, that is.



It's an app, app world

Jake Carroll gets up close and personal with the modern personalisation craze.

Lewis Carroll was a smart guy. In 1871, at the end of 'Through the Looking-Glass' he left a poem with no title. The words 'Life is but a dream' were placed for generations to ponder. We're living in a world that 50 years ago would have been hard to imagine. 100 years ago it would not have even been conceivable. Yet, reality and existence are still mysterious to us.

Look around you. You'll find a world littered with the latest gadgets and tech toys. If you poke around, you'd be unsurprised to find the majority of these devices customised and very personalised, as per their owners' moods, personality and appearance. In 1871, they were struggling with supplying current to light bulbs to make them glow, much less high-resolution AMOLED displays.

Rarely do we stop to think about how the thirst for customisation and personalisation came about. This month, we're going to uncover some of that.

Application mania

For the purposes of this article and these modern times, little bite-sized bits of software are generically referred to as 'apps'. Whether it's a tool to track your weight loss, or something to keep you abreast of the temperature of a nuclear reactor core perilously close to meltdown in the prefecture next door, there is an app for every occasion. Much of Apple's relatively recent

success rides on trends that have been created with iTunes and the App Store. So much so that the Android Marketplace followed suit, as did RIM's App World.

Micropayments

A micropayment is something that seems straightforward on the surface, but lives deeply rooted in the human psyche. When we need to part with large sums of money, it generally makes us more anxious than when we only have to part with a little, regardless of what we are receiving in return. It's interesting, then, that we don't mind paying for many tiny things, often, even if those many tiny things often make up a much larger dollar value that would make us uneasy about parting with that much money. Our perception is that, in the moment, it feels better to spend less, even if it adds up to more in the long run.

So, with that, a smart man set out to exploit these behavioural phenomena. Here is a hint, too. It wasn't Steve Jobs.

In the elder days of the Internet, when the W3C were considering ways to make the web a profitable place, the idea of the micropayment first cropped up. It was bandied about as a mechanism for online retailers to make a few

cents from each transaction. Initially, the W3C thought a novel way to implement this would be to embed transactions into HTTP error



The Satellaview. A God among console additions. In modern times, we don't think much about downloadable content for our consoles, much less need bulky add-on hardware to facilitate it.

codes, as discussed here: <http://www.w3.org/ECommerce/Micropayments/>

This was subsequently closed down and the project abandoned on the basis that micropayments (of this nature) never took off in a way that could be considered successful. Other methods of micropayment architecture became prevalent, with the rise of PayPal, Flattr and NetBill. In the late 1990s, there were strong research efforts into micro transaction technologies, with IBM and Compaq having an entire division each, to better understand and develop such facilities.

Years went by, and iTunes showed it's sometime ugly, sometimes wonderful head. iTunes aficionados will know that iTunes started life as SoundJam MP in 1999. Version 4 of

the era. We didn't have the bandwidth. We sure didn't have the computing power. A parallel can be drawn to tablet computing; it failed numerous times before due to a lack of computational capability and the technology to allow for true real time feedback in the 'multi touch' service interfaces we know today. When the technology caught up to our ideas and dreams, it all started to click, or touch.

Ecosystem

So we've overcome the technological hurdles, and we have the ideas firmly planted in the minds of millions about the granular downloading of content. Next comes the 'ecosystem' that is used to describe the development community. We're pretty sure this 'ecosystem' is a term

Without the application, the platform has no appeal. Without appeal, a product has no customers. It's the circle of life.

In a sense, the holy grail of targeted, directly delivered and injected marketing has been achieved here. The market is entirely cornered when a user has no obstacles or barriers to stop them from buying applications, as long as they are sitting at their computer, connected to the Internet.

The dark side

This all-reaching, always on, predictive, speculative and cheap means of software and entertainment distribution has a less nice side. There are significant critics of the Apple store and Android Marketplace. Apple's iTunes store often comes under fire from highly motivated and pure artists, who wish to keep a user experience 'whole', with the argument that an album should be presented in its entirety, rather than offered up with track level granularity.

Other artists are trying to come to grips with this in their own way, by realising the potential of digital distribution of audio content. Where, once an SACD or DVD-A were the only means to get high definition audio content to market, a 24bit, 192KHz FLAC or ALAC file can easily be put in place, transferred securely online in a matter of seconds.

The same can be said for content distribution of applications and movies. It has some significant benefits in terms of flexibility, reach

On December 25th 2007, 20 million song sales were made in one day. It changed the course of music sales forever.

iTunes implemented the 'Store' functionality. On December 25th 2007, 20 million song sales were made in one day. It changed the course of music sales forever. The game changed, and expectations changed with it. People came to expect everything at their fingertips.

Embedded

The idea of these micropayments and transactions was then, as a consequence, embedded in people. This is (now) just how stuff works. In the way that we pop a \$2 coin into a soft drink vending machine, and expect instant gratification, one expects that same instant buzz, when you click 'buy' on an album, through a store application.

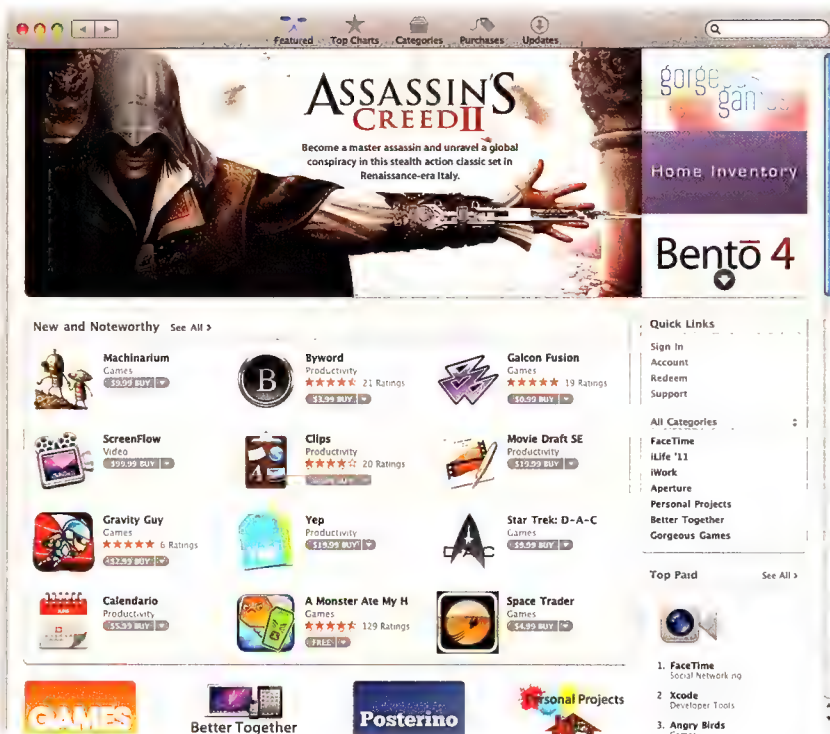
The next obvious step for the companies (and, unashamedly, we say this predominantly referencing Apple) was to push the same pay-per-download concept for movies and software.

The idea of Pay-Per-View has existed on cable TV stations in the USA and UK for many years. The idea that we'd one day use the same infrastructure to host internet services that carry digital downloads, over the same hybrid fibre coaxial cable was a long stretch of the imagination when cable was first introduced. 'Next gen' consoles, such as the 3DO, Sega Saturn and Atari Jaguar offered some very primitive download services through add-on modem systems that one could use to customise, add or expand their experience. Even earlier than this, Nintendo had a downloadable application and widget service for the Super Famicom (Super NES, in the west) known as Satellaview, though it was not available outside of Japan.

There was a sticking point however, with all of these services. The idea had leapt far beyond what the technology of the day was capable of. Streaming media, content on demand, real time application interactions were all too much for

individuals with slick haircuts and expensive Armani attire use liberally, when really, they are just making reference to the self-perpetuating nature of a developer community that feeds back into itself, once the ball is rolling and end users are engaged. Without the tools, the developers have no platform. Without the developers, the platform has no applications.





Critical mass reached, with integrated, targeted desktop delivery of applications. It sits on the task bar and dock, ever tempting.

of market and scalability, but for every benefit, somebody may be getting hurt – either financially, or in a content-control sense. Such a situation is true of application vetting, as is practiced by Apple. There are strict policies, rules and obligations that developers must follow to act in accordance with the App store. If these

of your device, for example, hence, such functionality is relegated to tools such as 'Winterboard' installed with the now notorious (yet refreshing, useful and helpful) Cydia, as a result of jailbreaking your device.

"3.3.15 If an Application requires or will have access to the cellular network, then

We either have a highly regulated, controlled and restrictive application platform, or a free, open and insecure-by-nature platform.

rules and obligations are not adhered to, your application (no matter how good, or how much the world could use it) may not make it onto the app store.

Of particular note, there are several sections in the guidelines that make it difficult and potentially harmful to developers on the platform to get involved:

"APIs and Functionality: 3.3.1 – Applications may only use Published APIs in the manner prescribed by Apple and must not use or call any unpublished or private APIs."

In one sense, this is all very logical. Apple are trying to achieve consistency and control across their platform and iOS. One way of doing this is preventing developers from doing things outside the boundaries.

Unfortunately, this also precludes many simple things and routines from being run on your device. Unless you're breaking rules, it's very hard to change the icons and look and feel

additionally such Applications:

- May not have Voice over Internet Protocol (VoIP) functionality using the cellular network."

That is an interesting inclusion. On the logical side of things, we see sense in such an inclusion, whereby Apple are (probably) taking steps to prevent the cellular networks from saturation issues, but on the other, we wonder about the problem with it, in the long run. Do Apple and its carrier partners simply want a larger slice of the data-usage pie and would they rather we are corralled into using a cellular providers' voice services (at a cost) instead?

Google are of course, no less guilty of much good and evil in the one fell swoop. Google's Android Marketplace has a sense of openness and less (perceived) restrictions than the Apple or RIM equivalent. Within this, however, the lack of any real curating power or

moderation means that many applications have the potential to do damage. That damage could be breaches of privacy, compromised device reliability, network reliability or otherwise.

Google were in the media relatively recently with their remote-kill functionality shown, when several apps were deemed inappropriate and a danger to users. These apps were subsequently disabled and removed from end user Android devices. This in turn made the community question just what capabilities Google had in terms of remote management, visibility and privacy over end user devices. Several journalists (that we might consider sensationalists) even attributed Google's apparent mismanagement of the marketplace as a key factor in hurting its ability to compete with Apple's store.

<http://nanocr.eu/2010/06/27/googles-mismanagement-of-the-android-market/>

There is a simple reality in all of this. We can't have it both ways. We either have a highly regulated, controlled and restrictive application platform, or a free, open and insecure-by-nature platform.



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Consumer toys and work tools

Our own experiences suggest that people love their iPads and iPhones for the gaming downloads and they (equally, in the same demographic of users) love their RIM Playbooks and Android devices for their powerful productivity applications and enterprise integration.

From a purely statistical perspective though, it seems that consumers don't really care too much for serious work on their iDevices.

The future for us and them

As a software engineer, and a developer, the future looks to be splitting into two distinct directions.

1. Developers will play the game, and go the way of content provider platforms with digital distribution tools, such as Valve's STEAM, the Apple store, the Android Marketplace et al. The bigger implication of this path might be that development houses will have fewer overheads than the traditional giants of the industry. Think about the profit margins of a company such as EA or Sega, in comparison to that of the now legendary Brisbane-based

Halfbrick Studios. It might give individuals much more of an opportunity to become successful in an ordinarily 'big boys only' market. The converse may also be the case, however, whereby the large provider platforms become ruthless and stifling, in a similar pattern to record companies and artists' contracts to produce music every X years. Fees and the cut that the platform providers take may become exorbitant. This is however, still conjecture.

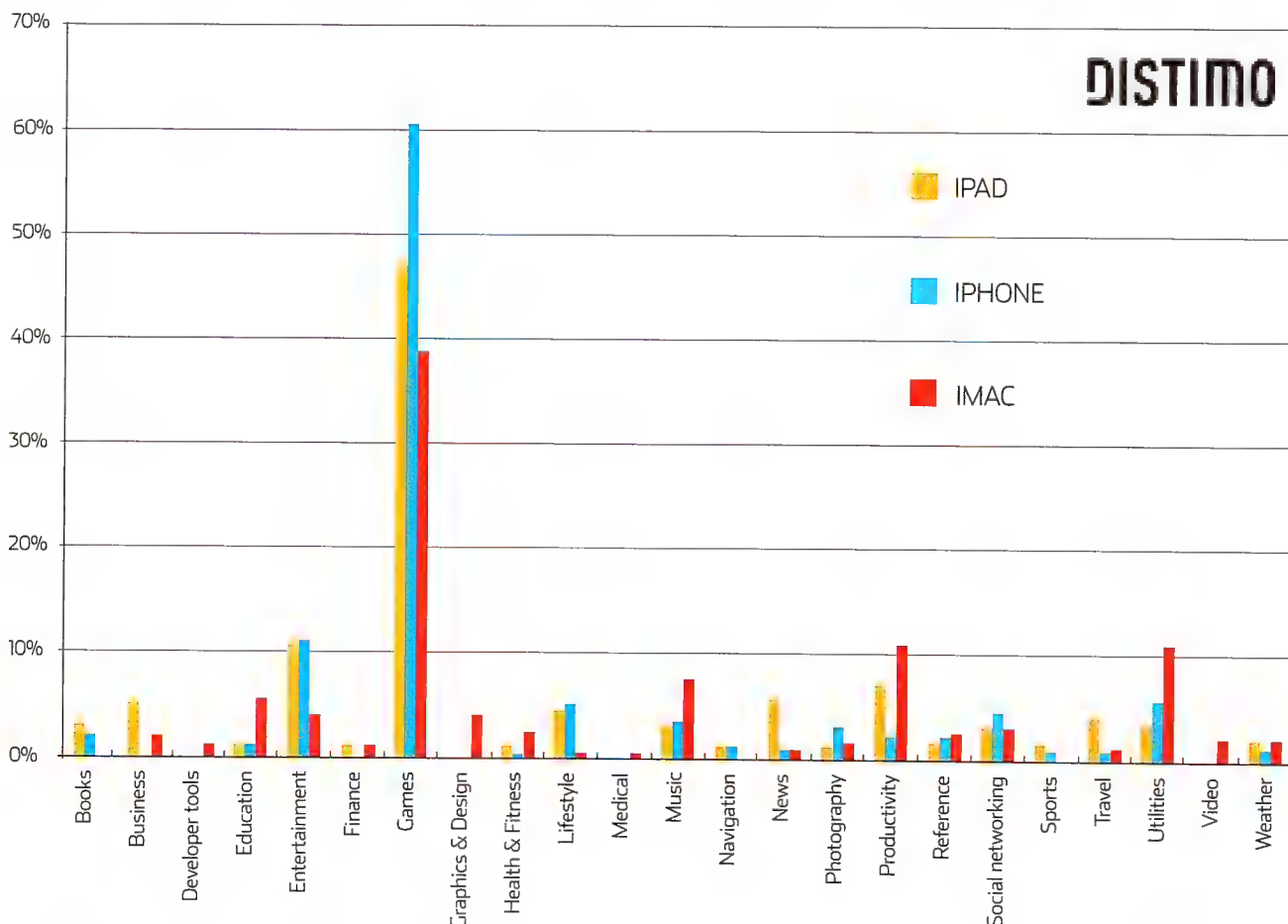
2. Developers will go the traditional way. Provide media on a disc. Ship it in a box and sell it in a physical store, maintaining what (arguably) is the status quo.

Maybe it's a moot point us even mentioning this second option and future direction, purely on the basis that many individuals already accept that physical distribution of media is fading, and that, with the speed of our internet connections only rising, it isn't unimaginable that Blu-ray size disk images and content will be flying to our machines (legitimately) in minutes, and not hours, quite soon.

It's extremely easy to be critical of Apple, Google, RIM, Valve and others who have broken into the brave new world of feeding us content, as our whim demands it. From the consumer standpoint, we can accuse the companies of being forceful by giving us such connectivity.



Many an argument has been raised suggesting Apple's App-store integration to the desktop is an obvious grab for further dominance and cash. All that said, we're left in that same old puzzling state, where we are given all the choice in the world, including much that was unimaginable only a few years ago – and for some reason, even though we have the conscious capability to simply not click the 'Add to cart' button, we still complain...



The hard numbers. Games are in. Everything else? Meh.

<https://labs.ericsson.com/developer-community/blog/distimo-report-insights-apple-s-app-ecosystem-comparing-mac-ipad-and-iphone>

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INPUTOUTPUT

Dan Rutter brings the answers to your questions like no-one else can.

I/O OF THE MONTH

Share my pain

I I read your column in Atomic 119, about how nobody's PC works right and your Win7 'Not Responding Problem'. I think my PC's got the same disease, which is a bugger since it's only two months old.

The computer regularly sort of 'semi' locks up, with the drive light stuck on and incredible thrashing and lots of greyed out 'not responding' windows if you try to do pretty much anything.

I figured out that it happens whenever I open a new Explorer window. If I go to an existing folder window and click in the address bar and tell it to view some other folder or drive, there's no problem. If I open a new window viewing that same new folder or drive, on goes the drive light and away goes the performance. Oh, and file requesters count as 'new Explorer windows'; any time I go to save a new file, away we go again.

The PC is a Lynnfield Core i5 quad with 4GB RAM, 1.5TB and 2TB hard drives, and 64-bit Win7. I built it with my old nVidia card in it, and upgraded to a Radeon HD 5750 a couple of weeks ago. Could the driver change have something to do with this?

Henry Amaya

O Yes, you seem to have true, pure-strain, noisome and squamous Not-Responding Problem. I bet the drive light sticks on even if all you do is *right-click* in a folder window, right?

The hard-core, total-paralysis manifestation of this problem arises when you trigger the glitch a *second* time, before the last dose of disk-thrashing is over. This can easily stop the computer from being useful for anything for, oh, an easy quarter of an hour. If you need an even longer break from your PC, feel free to right-click another window. Anything that flogs the heck out of the hard drive can *masquerade* as this problem, though. If someone on your network decides to start simultaneously copying 20 large files in parallel from a shared drive on your computer, for instance, normal versions of Windows will become hideously unresponsive. Multiple programs doing disk-intensive things – like file-indexing and

virus-scanning, for instance – at the same time can also cause this sort of problem.

In these other cases, you can often find the culprit(s) quite easily in Task Manager or the much fancier Process Explorer. One or more processes will be doing lots of reads and/or writes, and probably using a decent chunk of CPU time.

But if you find yourself jealously hoarding and recycling your folder windows, then you've got what I had, caused by a corrupt user account. Here, Task Manager isn't very useful. You may see *cofire.exe*, the Corrupted File Recovery Client, in the process list rather more often than usual, but the only other insight I got even by using Process Explorer was unexpected activity by the special System process, which still wasn't using any significant CPU time.

Anyway, to cure the problem, you need to make a new user account. This is easy; just log in as an administrator, go to Control Panel > User Accounts and Family Safety (where, of course, you can order income insurance, childproof cupboard latches and guard dogs from Microsoft) > User Accounts > Manage Accounts, then 'Create a new account', and fill in the little form.

Now, before anything else, log out of the account you're logged into, log into the new account, and see if the problem persists.

If it does, you can either do a full reinstall, or visit a rough pub and hire a bloke to arrange an unfortunate accident for this cursed machine that has failed you for the last time.

Presuming that the new account works, you can now enjoy copying all of your stuff over from the old account. You are practically certain to not be able to do this in a straightforward way.

In Win7, all of your desktop contents, game save files and many other application-config sorts of things are in `[boot drive]:\Users\[profile name]`. So if you boot from C, and your old account was Foo, and your new one is Bar, you'd *think* you could just copy everything from `C:\Users\Foo` to `C:\Users\Bar` and be back in business.

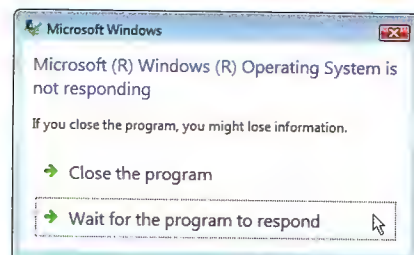
In reality, you'll have no chance of making this work unless you make a temporary third administrator account and log into



that to do the copying, and then it probably won't work anyway. Microsoft's traditional Incomprehensible Permissions Issues will immediately present themselves (at one point, I managed to end up with Windows pretty darn sure it didn't have permission to open *explorer.exe*...), and there are also oddities like little ghost shortcuts which can't be copied from one profile to another, and which will instantly and silently stop a copy operation when it gets to them.

Eventually, I realised that if the old profile was corrupt, it was not astonishing that I couldn't make it fresh and new by just copying all of its files somewhere. So I logged in as my temporary third account, killed the half-copied new account, and made a fresh replacement. Then I backed up the old profile folder to another drive to get the files out of their weird-permissions-poisoned ghetto without trying to wedge them into a new profile at the same time, then logged into my real new account and only copied back the stuff I actually found myself needing.

If I'd done that in the first place, the whole experience would have been no more annoying, and significantly faster, than reinstalling Windows over the top of itself.



84 tiny pinholes

I I recently ordered what was advertised as an IDE-SATA-USB cable from eBay. It seems to have a SATA port, and two IDE looking plugs on either side, of different sizes.

I connected the thing with the only slot that seems to fit to my old laptop HD, and the other side into the USB port – nothing.

I assume that's because I haven't plugged in the power supply, which is the problem.

I'm not sure where to plug it in. The plug end has a four prong horizontal connection piece attaching to a four-wire adapting piece ending with a little flat plug with some metal contacts in it. I have no idea where to stick this to supply power.

The HD is from a laptop, it's a Hitachi Travelstar from Jun 05. It is all enclosed in metal casing save for the IDE connecting pins.

Pictures are attached.

Do you know how to get this thing spinning?

Jason Correia

O As you surmised, the higher-density PATA connector on your USB-to-three-kinds-of-ATA cable is for 2.5-inch PATA drives, the larger PATA connector is for normal 3.5- and 5.25-inch drives, and the SATA connector is for any size of SATA drive, because SATA has the same connectors (both power and data) for all three sizes of drive.

The bad news is that you'll have to buy something else. The good news is that it'll cost you less than \$5 on eBay.

The 2.5-inch PATA connector has 44 pins, instead of the 40 of regular PATA, because it includes power pins. 2.5-inch PATA drives have no separate power connector.

(Here's the pinout, in the unlikely event that you are curious: http://pinouts.ru/HD/Ata44Internal_pinout.shtml)

These little laptop drives run from five volts only, without the 12V rail required by larger drives. What's *supposed* to happen when you plug one in with one of these USB adapter doodads is that the 5V USB power supply is passed essentially unaltered to the drive. The 2.5 watts that's the most USB 1 and 2 can deliver, according to its specification, should be enough to spin the little drive up.

This can go wrong if the drive needs more power than the USB port can deliver, either because it needs more than 2.5 watts, or because the USB port is weedy. A USB port on an unpowered USB hub, for instance, should never be able to deliver the full 2.5 watts (an unpowered hub runs itself, and everything you plug into it, from the 2.5 watts of the single port you connect it to). But USB controllers with above-spec or below-spec power output, and various other oddities, mean that some setups that ought to work do not, and others that ought not to work, do.



It's easy to adapt any kind of drive to any other, but you *must* have the assistance of a cat.

(USB 3.0, by the way, can deliver 4.5 watts in maximum-speed mode, or 7.5 watts at USB 2 speed. These cheap adapter cables may or may not be able to make use of that.)

The solution to this problem is to get more power to the drive.

Many dirt-cheap external USB cases for 2.5in drives come with a Y-shaped cable which has two 'A' plugs (the ones that go into the computer) both leading to one mini-plug that connects to the drive case. One plug is a normal fully-wired USB connector, but the other one only has the power wires, and not the data wires, connected. Plug 'em both in to full-power USB ports (like the 'root ports' on your PC/laptop) and the box gets enough juice to spin up pretty much any 2.5in drive.

This is an inelegant solution and probably violates specifications all over the place, but it seems to work very well, and cases like this are very cheap.

So that'd probably solve your problem, and it's not really much less convenient than one of the three-way adapter cables like the one you've got, since you don't have to put the lid back on the little drive box if you don't want to.

Another option is to get a 40-to-44-pin PATA adapter board. They accept a standard Molex drive-power plug, which will *definitely* be able to spin up any functional 2.5-inch drive. If you want plug-and-play, you can plug your ATA-to-USB adapter cable into the adapter-board.



The back of a 2.5-inch PATA drive. One 44-pin data-cable block, with pin 20 removed for keying, and four more pins for master/slave/CS jumper setting.



Metacritique

Ashton Mills takes the astroturfers to task.

Oh. Bad Bioware. Caught with your hand in the cookie jar – what kind of hell must be reserved for employees of a company astroturfing for their own product, without the integrity to disclose who they are or who they work for? Probably one filled with Cyberdemons and Arch-viles trapped on a level with no exits and infinite spawns... No, that would be too kind a punishment.

Bioware employees were caught on Metacritic regaling just how incredible Dragon Age 2 was along, of course, with a 10/10 score, under the guise of your average gamer. That the posts sounded straight out of a press release is sad enough (including the use of that old gem,

decide if a game is worth buying. So no it's not the same, at all. It's dishonest and dirty. In fact it's fraud. Not the law-breaking, lawyer-hungry punishable kind, but fraud none the less. It's the manipulation of you, the reader, to influence your purchasing decision. And you'd certainly be pissed if you bought a game based off a high rating, only to find that it sucked.


Does DA2 suck? I'm not touching that one, though right now the Metacritic User score is 4.3, as opposed to the 8.2 from the 'official' media.

Which raises another point – while mainstream media has a role to play, the fact is real-world user opinions often hold more weight than expert. It's not just that some have an

and remove some of these, but it's an uphill fight. So who can you trust?

The answer is your fellow gamers, but only if you keep the channels clear. Any company, any developer, any publisher trying to leverage that trust has to be hung, drawn, and quartered. As painfully, and publicly, as possible. As I am doing here.

For Bioware – grow up. For EA – get a clue. For you – don't put up with it. If you find it, publicise it wide and far.

Your fellow gamers will thank you for it. 

Damn straight, Ashton.
amills@atomicmpc.com

Why stoop so low for such a great company? Were you tired of being a golden boy among the gaming fraternity, and wanted to kick yourself in the nuts?

"flawless"), that the employees were even doing this speaks volumes of Bioware's calibre. Why stoop so low for such a great company?

Were you tired of being a golden boy among the gaming fraternity, and wanted to kick yourself in the nuts? Or do you really think so low of the very people that keep your business alive, the gamers who buy your products?

As is the way with these things (see *Streisand effect*) Bioware hastily tried to remove the reviews. But the internet does not forget, and cached copies started doing the rounds.

There is no acceptable excuse for this, though EA tried to defend the actions of its henchling. "That's how it works in the Oscars, that's how it works in the Grammy's" said a senior rep. Except, Metacritic isn't an industry accolade, it's a website and rating system people use to

inherent distrust of mainstream media (because it's advertising that pays the bills, after all), it's also that a user writing a review isn't being paid to do so. It's not a job, it's a genuine opinion someone took the time to write. These are then, inherently, gold the type of which just doesn't grow on trees. And so the morally bankrupt will try and rip them off. And this, of course, trashes the trust between these companies and their bread and butter: the people who buy their games. Which is a remarkably stupid thing to do.

Of course, Bioware is not alone. It's certainly not the first gaming company to do this, it's just the most recent example. It's even infected the mobile market, with some app developers creating fake accounts to astroturf on iTunes. We're not talking one or two here, but *thousands* of false user reviews. Apple can spot



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- Storage Review

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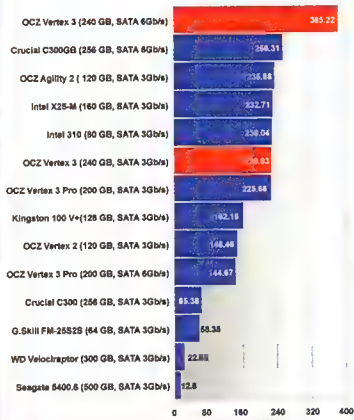
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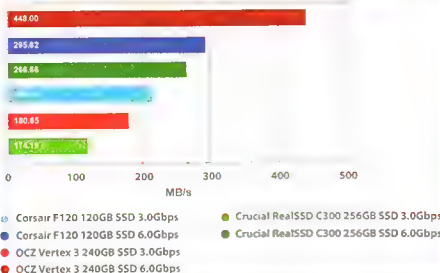
Windows Vista Startup Throughput



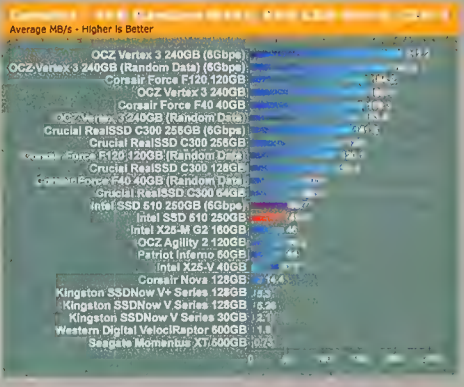
STORAGE REVIEW

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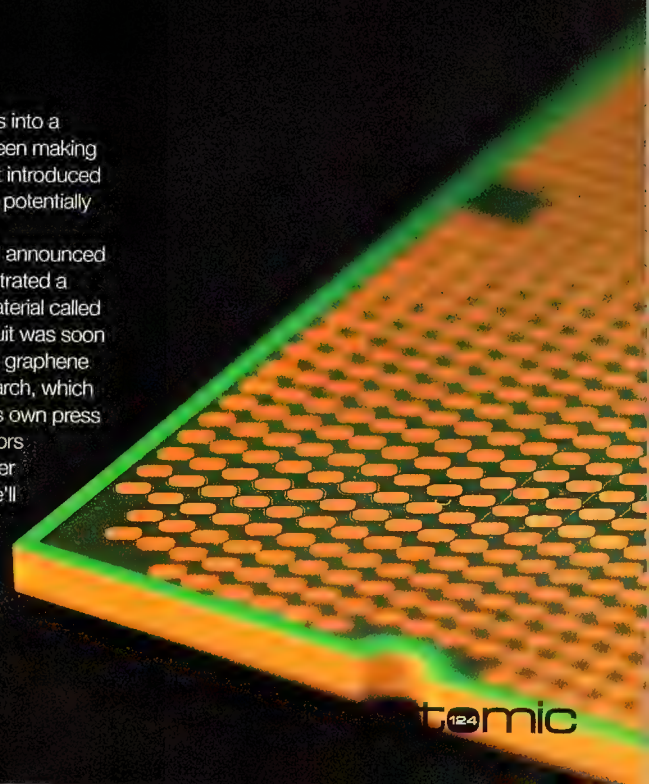
The future of Silicon Chips

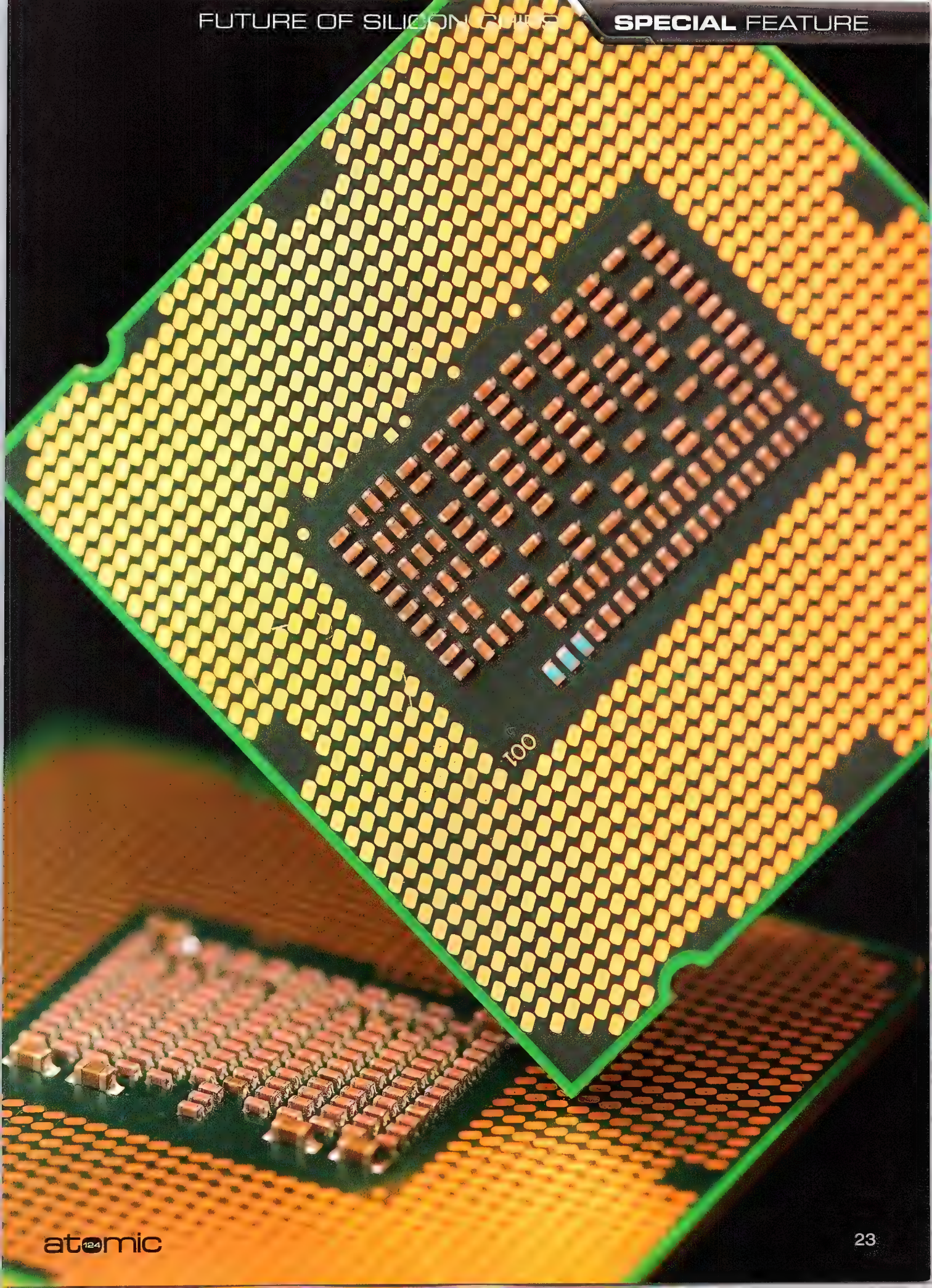
While silicon has provided the building blocks for computer chips for more than four decades, 100GHz graphene transistors have already been demonstrated. With talk of tomorrow's chips being packed with optical interconnects and nanowires, **Ben Hardwidge** investigates the future of chip materials and whether silicon's days are numbered.

If someone mentions silicon, most people immediately think of computer chips; or they might imagine ridiculously inflated body parts that have been expanded with the silicon-based polymer silicone. Silicon is the most common metalloid in the periodic table, it accounts for more than a quarter of the elements in the earth's crust and we've depended on its thermal conductive properties to propagate the computing revolution over the last few decades. Computer chips don't have to be made from silicon though. The nature of binary is that it only requires a device that can be switched on or off. You could perform the same task using a binary switch made from all sorts of other materials. In fact, early binary computers such as the 1944 EDVAC used thousands of vacuum tubes and mercury delay line memory. The main reason we use silicon is because it still functions as a semiconductor at high temperatures, making it ideal for packing

millions of fast-switching transistors into a densely packed space. Intel has been making processors from silicon since it first introduced the 4-bit 4004 in 1971, but does a potentially better material exist?

In February 2010, scientists at IBM announced that they had successfully demonstrated a 100GHz transistor made from a material called graphene. The Internet gossip circuit was soon awash with predictions of terahertz graphene processors and silicon's funeral march, which is hardly surprising given that IBM's own press statement claimed that the transistors could be featured in 'zippy computer processors' in a decade's time. We'll come straight to the point before we start singing the silicon swansong though – graphene won't fully replace silicon as the main material used for CPUs – at least not yet.







Binary computers don't have to be built from silicon. The EFVAC from 1944 contained thousands of vacuum tubes and mercury delay line memory instead.

IBM's Yu-Ming Lin from IBM Research, Nanometer Scale Science and Technology explained to us that "there's an important distinction between the graphene transistors that we demonstrated, and the transistors used in a CPU".

"Unlike silicon," says Lin, "graphene doesn't have an energy gap, and therefore graphene can't be 'switched off', resulting in a small on/off ratio." He also pointed out that the 100GHz frequency reported was the cut-off frequency (the highest frequency at which the transistor still operates) rather than the target frequency of a transistor, which would be around a third of this. Even so, IBM says this is still more than double the cut-off frequency of current top-end silicon transistors, which is currently around 40GHz. Graphene will still be a very important material in the future of integrated circuits, though, and this includes CPUs, even if it doesn't fully replace silicon. Lin points out that the on/off ratio isn't an issue in RF circuitry, for example, and it has lots of properties that potentially make it preferable to silicon, depending on the circumstances.

Looking like the cross-section of a Crunchie bar, graphene groups carbon atoms and their bonds into a lattice of tiny hexagons. And when we say tiny, we mean as small as possible without splitting the atom. The length of one carbon bond is just 0.142nm, and the material is basically two-dimensional at the atomic level, meaning that a sheet of graphene has the thickness of a single carbon atom. As a point of reference, a 1mm-high block of graphene would contain over three million

sheets. Does this mean that we could create transistors at the atomic level? It does indeed. In fact, Dr Kostya Novoselov and Professor Andre Geim from The School of Physics and Astronomy at The University of Manchester did exactly that in 2008, when they created the world's smallest transistor from graphene; it had a width of ten atoms and the thickness of just a single atom.

"In principle, there's no limit to the size of a graphene transistor," says Lin. "Compared to silicon, graphene is more robust in terms of device scaling, because it has the thickness of a single layer of atoms, while it's known that the quality of silicon will suffer significantly once it's thinned down." Size and scalability isn't the only benefit of graphene either. "Graphene possesses a much higher

can also be clocked much higher than comparable transistors made from silicon. Not only that, but in September 2010, researchers at the University of California, Los Angeles (UCLA) reported that they had achieved a phenomenal graphene transistor cut-off frequency of 300GHz. So why does graphene offer such massively higher clock speeds?

"Graphene transistors can achieve a higher clock speed (or frequency) than those made of silicon with the same gate length because the electrons in graphene can move at a higher speed than those in silicon," explains Lin. "The speed of a transistor is basically determined by the velocity of electrons, and is inversely proportional to the length of the gate." If graphene were capable of the same on/off ratio as silicon, it would probably entirely usurp

Graphene devices are less temperature-sensitive, indicating that they can operate within a larger temperature range

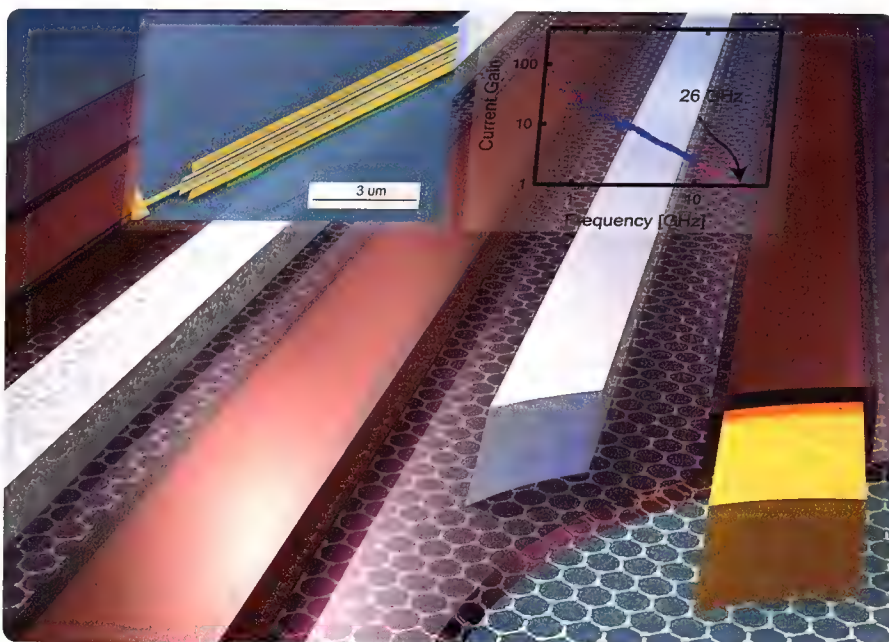
thermal conductivity than silicon," explains Lin. "Therefore, it can transport and dissipate heat more efficiently than silicon. More importantly, unlike silicon, the performance of graphene devices is less temperature-sensitive, indicating that graphene devices can operate within a larger temperature range. These factors would also mitigate some of the power requirements we currently face with silicon." We therefore have a material that's scalable to the atomic level and less susceptible to heat than silicon.

What's more, as IBM's 100GHz cut-off frequency demonstrated, graphene transistors

silicon in the world of computer chips once it was past the research phase. As it is, it's likely to replace silicon in some areas but not in others – at least not in its current research state. "Graphene as it is won't replace the role of silicon in the digital computing regime," confirms Lin. "However, it may complement silicon in the form of a hybrid circuit to enrich the functionality of computer chips."

Hybrid Chips

Rather than silicon being completely replaced, it's more likely that we'll continue to integrate new materials into chips, and silicon itself, in



IBM Scientists from the company's T. J. Watson Research Center have demonstrated the operation of graphene field-effect transistors at 100GHz frequencies.

order to improve them. Silicon may not be perfect, but it's worth remembering that it was chosen as the default chip-building material for a reason. It's the most appropriate material for the job, and recently, only a few tweaks have been required to keep it in shape.

Intel's director of components research, Mike Mayberry, told us that "silicon's properties make it a nearly ideal material". He also pointed out that "the industry has so much experience with it that there are no plans to move away from silicon as the substrate for chips". The substrate is the material on which the logic gate of a transistor sits, and is separated from the gate via an insulating material. However, while silicon is likely to remain the standard material for the substrate of chips, there's still plenty of room for experimentation with other materials in different parts of the chip, including the transistors.

"We're actively investigating the addition of new materials to silicon to make better transistors," says Mayberry, offering the examples of high-k dielectrics such as hafnium oxide (HfO₂) and III/V semiconductors such as gallium arsenide (GaAs).

Let's start with the latter. Like graphene, gallium arsenide has a major bonus over silicon in the form of its higher electron velocity, enabling transistors to run at higher operating frequencies. In fact, back in 1969, the original patent application for a GaAs semiconductor device, from a pair of Japanese inventors called Takeshi Saito and Hasegawa Fumio, stated that GaAs diodes could have a high cut-off frequency of 'over 300GHz'. It's also less sensitive to heat, which again makes it preferable to silicon for making transistors. Unlike silicon, GaAs is a compound material made from two elements – gallium and arsenic. It's called a III/V material due to the parts of the periodic table from which its fundamental elements are grouped – III materials are in the boron group and V materials are in the nitrogen group. Gallium arsenide has already been used in integrated circuits for decades, and the Cray Group even used it to build a supercomputer processor in the 1990s. However, it's only recently that Intel has started to seriously talk about it being used inside its CPUs.

A part of the problem with introducing new materials for chips is the cost. You don't generally find blocks of silicon occurring in nature, but it's one of our planet's most abundant elements – you can easily find it in sand, for example. Conversely, creating a compound of two rarer elements and then fabricating processor parts from them automatically increases the cost of manufacturing. For this reason, silicon will still be used as the default material for substrates in computing chips for some time, but Intel is keen to introduce new materials for various other parts of the CPU. Last year, Intel reported high-k dielectric results from InGaAs



Silicon is one of our planet's most abundant elements, but putting together a compound of two rarer elements and then fabricating processor parts from them automatically pushes up the cost of manufacturing.

(indium gallium arsenide), and this year it also reported the results using germanium (Ge – a group IV material like silicon). According to Mayberry, "both results show a possible path forward".

"The material silicon itself isn't a limiter," explains Mayberry, "but there are challenges to be overcome with shrinking feature sizes. Examples are lithography, interconnect speed,

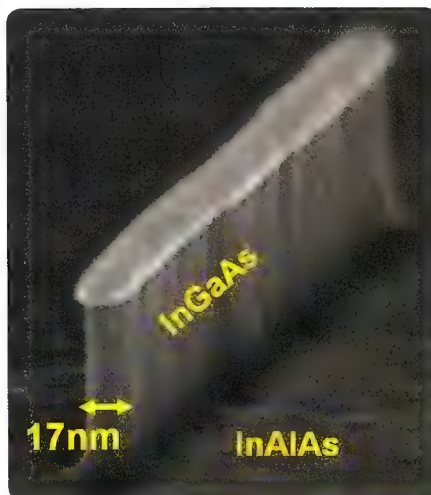
aluminium interconnects have been replaced by copper/silicon dioxide dielectrics, while polysilicon gates have been replaced by high-k/metal gate materials at Intel."

Meanwhile, hafnium oxide is already being used as a high-k dielectric in Intel's current line-up of CPUs. Basically, instead of a transistor featuring a silicon logic gate that's separated from the silicon substrate via a

Part of the problem with introducing new materials for chips is the cost. Silicon is one of our planet's most abundant elements – you can easily find it in sand, for example.

memory cell size, transistor performance and energy efficiency."

"While silicon remains the substrate for manufacturing," says Mayberry, "various components are being replaced. For instance,

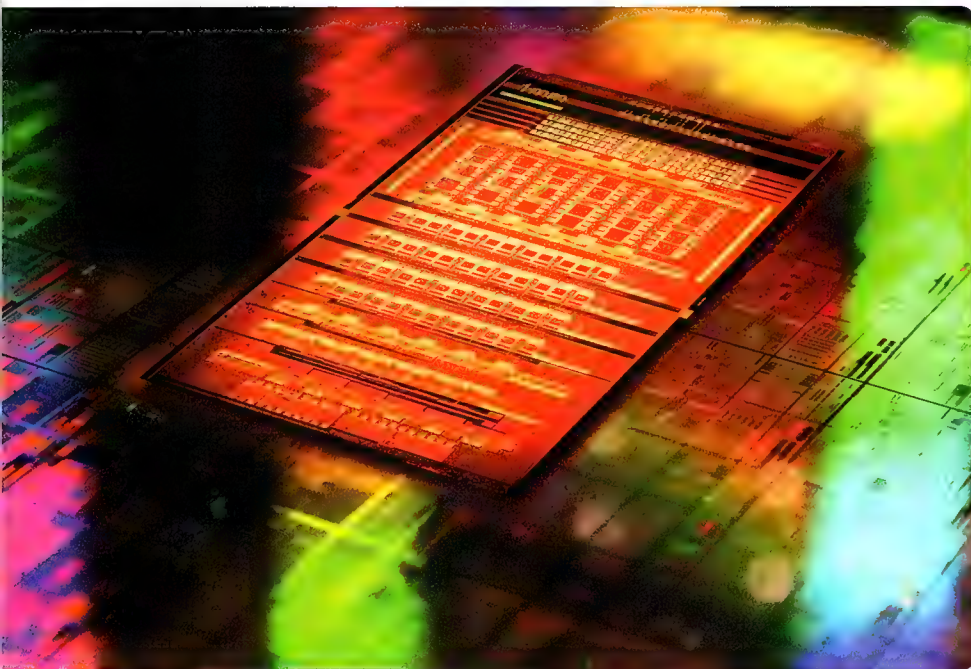


Unlike silicon, compound semiconductors are made out of several materials, such as this tall thin fin of Indium Gallium Arsenide.

silicon dioxide insulator, a high-k/metal gate transistor features a metal gate and a high-k dielectric insulator. The main advantage of using a high-k dielectric material instead of silicon is the strength and thickness of the material. Silicon dioxide transistors have major problems with leaking current as they're made progressively thinner, but thicker high-k materials are don't leak as much, making them an ideal material as transistors become smaller. This is a prime area in which silicon is likely to be completely replaced. "This thicker class of materials, known as 'high-k', will replace today's silicon dioxide technology," says Mayberry, adding that this will "then provide extendibility over several generations".

Interconnects

Aside from the transistors themselves, the interconnects between the components of a processor are also rapidly changing in terms of the materials they use. Copper is already used to create interconnects inside CPUs and there has been research into using nanowires as interconnects (more on this later). However, one potential future development here is the use of optical connections.



Above and Below: IBM's new CMOS Integrated Silicon Nanophotonics chip technology integrates electrical and optical devices on the same piece of silicon, enabling computer chips to communicate using pulses of light instead of electrical signals. Lab image courtesy of Bob Goldberg.

We already use fibre optics for everything from audio connections to broadband and TV, but optics are also making their way into computers as high-speed connections. Intel's Light Peak technology has already been in the spotlight as a potential replacement for USB and FireWire. Offering a bandwidth of 10Gb/sec in both directions, which Intel says will rise to 100Gb/sec within ten years of launch, Light Peak could potentially revolutionise external devices. According to Intel, the

combination of technology advancement and business factors will set the timing," says Demain. "This will make full integration a viable option in the long rather than short term." Research into optical processor connections, dubbed nanophotonics, is already in full flow though. In December 2010, IBM unveiled a chip that featured both electrical and optical devices on the same piece of silicon.

"With optical communications embedded into the processor chips," said Dr. T.C. Chen,

vice president of science and technology at IBM Research, "the prospect of building power-efficient computer systems with performance at the exaflop level is one step closer to reality." Not only that, but IBM also says that the process involves "adding just a few more processing modules to a standard CMOS fabrication flow", resulting in "a variety of silicon nanophotonics components". The key word here, of course, is silicon.

As such, integrating optical interconnects into a processor could be much cheaper than introducing new compound materials such as gallium arsenide to the mix. "As a result, single-chip optical communications transceivers can now be manufactured in a standard CMOS foundry," says IBM, "rather than assembled from multiple parts made with expensive compound semiconductor technology."

Nanowires

Optical connections aren't the only future possibility when it comes to internal interconnects in a processor. Another potential development involves nanowires, a term that encompasses a variety of definitions depending on who you ask. Some people claim that a nanowire has a width of just a single nanometre or less, but it's generally accepted that the term can also be used to describe wires with a width measured in tens of nanometres.

Nanowires can also be manufactured from a variety of materials, including metals, insulators and semiconductors. In terms of making circuits smaller, nanowires clearly have many benefits, but they also present a challenge, as this is the scale at which quantum mechanical effects are observed. Investigating quantum mechanics in depth is beyond the scope of this feature, but this is basically the point at which it becomes difficult to make accurate predictions about how a material will behave.

Nanowires are still very much in the embryonic stages of research, but this isn't to say that they can't play a part in future CPUs.

Integrating optical interconnects into a processor could be much cheaper than introducing new compound materials...

technology could enable you to transfer an entire Blu-ray movie in less than 30 seconds. Intel's ambitions for optics don't stop there though. We caught up with Intel's strategy and business initiative director for its Photonics Technology Lab, Jeff Demain, who predicts that optics could become much smaller and result in super high-speed interconnects not only inside a PC, but also inside a processor.

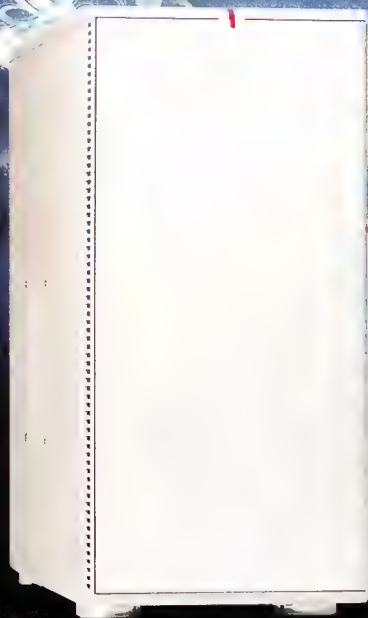
"The idea of optics within a microprocessor for high-speed interconnect certainly has merit," Demain told us. "An industry path one could envision towards this goal would start with optics outside the system (today's active cable), then optics co-packaged within the system, and finally optics within the microprocessor."

We could wait some time for this, but it isn't outside the realms of possibility. "The





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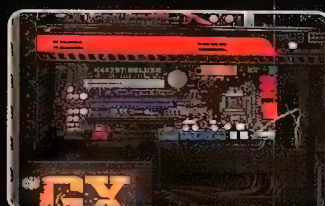
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We interviewed Intel's technology analyst, Rob Willoner, about their use in processors. He reckons that "nanowires have a potential application as either interconnects or transistor channels", although he added that they're 'still very much in the research phase'.

According to Willoner, part of the problem with implementing nanowires is the sheer complexity of miniature integrated circuits. He offers the example of carbon nanotubes – a type of nanowire. "These are grown from a seed catalyst, and have very daunting placement challenges when you consider trying to hook up a billion devices."

Spintronics

While we're on the subject of atomic-level quantum computing, it's also worth talking about another exciting development in computing – spintronics. This process uses the spin of an electron to represent binary ones and zeroes in terms of storage space.

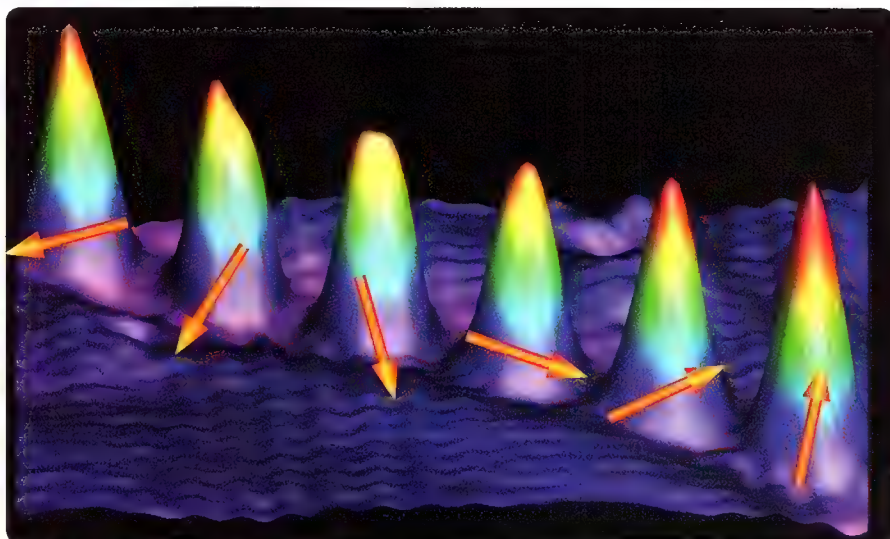
The actual 'spin' is a quantum mechanical property of electrons, and in spintronics, it can be effectively used to send a signal to a transistor without any charge. Normally, a transistor requires a current between the source and the drain (on either side of the gate) in order to operate. However, using spintronics, a transistor can instead obtain its data directly from the spin of an electron.

The theory of spintronics is already used in some computing devices, such as the GMR heads in hard drives, but we're still a long way from seeing it used in processors. In fact, at the 2008 Intel Developer Forum in Taipei, Intel stated that it would be at least another ten years before spintronics made its way into computer chips.

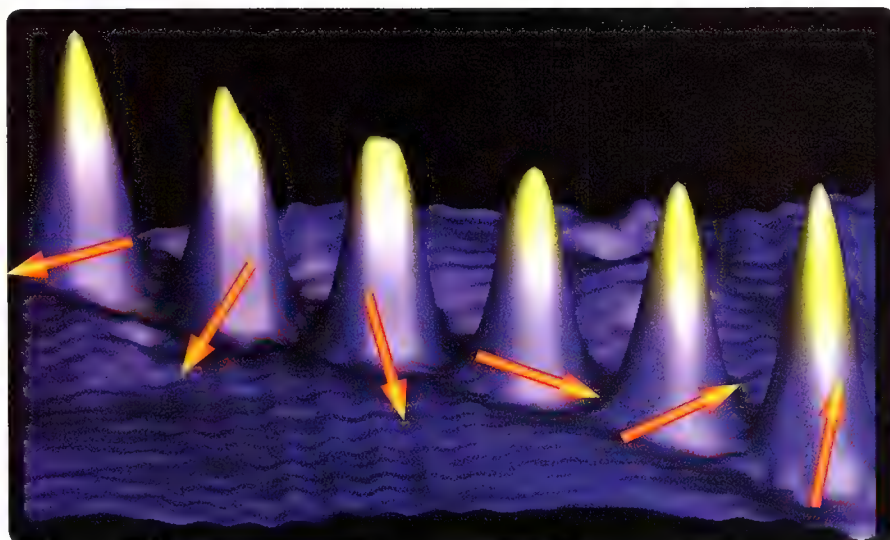
Even so, research into spintronics is forging ahead at an amazing rate, and last year the 'spin' phenomenon was even photographed by a team of physicists at the University of Hamburg. By potentially limiting the need for charge, spintronics could result in chips producing much less heat, which can only be helpful given that transistors are being packed more densely into chip packages.

Conclusion

After a few decades spent simply packing in smaller and smaller transistors, the weaknesses of silicon are starting to show and resolving the problem is leading to some really interesting innovations. While silicon is likely to remain an important material in CPU production for the foreseeable future, experiments with graphene have demonstrated the potential for new transistor materials, and we're likely to see graphene replacing silicon in other types of integrated circuit in the future. In fact, further development of graphene could result in completely new devices that can take advantage of its ability to run at higher frequencies without needing the larger on/off ratio provided by silicon.



The 'spin' of electrons was photographed last year by researchers at the University of Hamburg. The image showed that individual cobalt atoms appeared as a single protrusion if the spin direction was upward, and as double protrusions with equal heights when the spin direction was downward. Image courtesy Saw-Wai Hla, Ohio University



After a few decades spent simply packing in smaller and smaller transistors, the weaknesses of silicon are starting to show...

"Graphene is still very much in the research phase," explains Intel's Mike Mayberry, "but researchers are predicting a number of interesting properties for it and experimentalists are trying to confirm them." According to Mayberry, these properties "may translate into new applications that don't look like conventional devices, with further research".

We probably won't see the 30GHz graphene CPU that many people predicted but there are some amazing developments going on at the atomic level. The fact that we can produce a transistor with the thickness of a single atom is an incredible achievement, as are the concepts of spintronics and nanowires.

Silicon is here to stay for the moment, but more experimentation is required to keep it going as transistors become thinner and leak more current. We're likely to see more semiconductor materials introduced to the mix over the next few years, and we could also see the integration of other ideas such as optical interconnects and carbon nanotubes in future processors.

With so many innovations focused on reducing the power consumption and heat output of transistors, while also potentially increasing clock frequency, tomorrow's chips are not only going to be much faster, but also much cooler and smaller than anything we've seen so far. (C)

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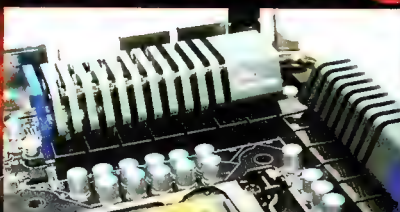


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HARDWARE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

This month, we're going to take a moment to stop and spare a thought for all the people who make our Hardware section possible.

No, not our dear Editor, or master reviewers John and Vito – although they are most certainly awesome and we couldn't do it without them.

We're talking the people who make the tech. The people at AMD, and saw fit to bestow upon

the world the blazing 6990. We're talking the lovely folks at Silverstone, who have made David weak at the knees and thus a pleasure to be around. We're talking about GIGABYTE, and ASUS, and Intel, and all those without whom these pages would be awfully bare.

To all of you out there who make, design, test and distribute the tech: we thank you.

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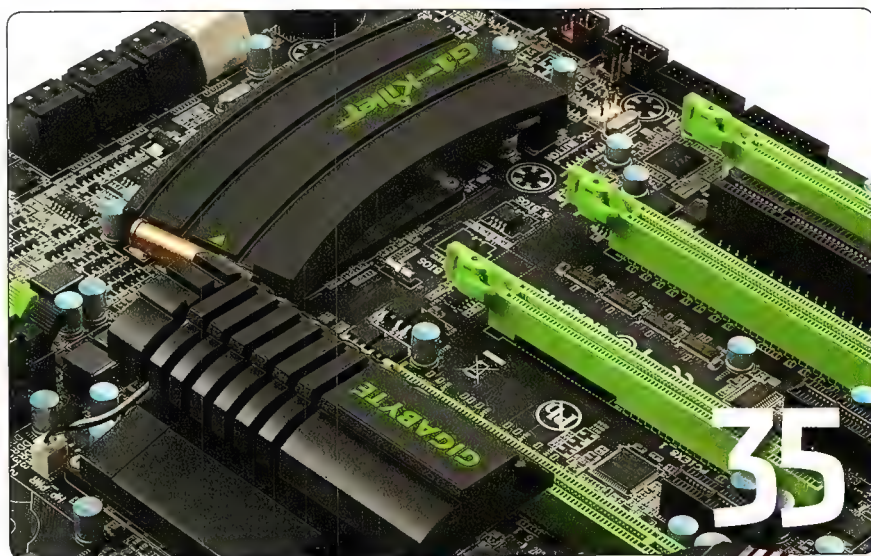
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HOW WE TEST

We do a lot of testing in our labs, and we look long and hard at every piece of hardware to determine whether or not it passes muster. From taking a new card out of its packaging, to bundled extras, to performance, every facet of a given piece of kit's 'user experience' is under scrutiny.

In some instances, we have tough benchmarks to help us rate gear. For a CPU or a graphics card, raw performance is, of course, the most vital stat as whether it stinks or smells like roses, as well as the ability to overclock well. But there are other things we pay attention to in the review process.

Value for money is an important consideration, especially in the current financial climate. High end gear is expensive enough as it is, so we look for good bundles. For instance, a graphics card that comes with a game or two, all the cabling you'll need, and little surprises like tools and other bumpf will score higher than a card that costs similar, but doesn't give you any presents.

Build quality is another thing we rate. From a PC case to a motherboard, we like our hardware well-made and capable of taking a bit of punishment. We also like any included manuals to be clear and concise.

A lot of what we look for can be hard to put into numbers, we admit, but we try to think about what any enthusiast would think about their new gear after laying down money for it, installing it, and then using it.

And our benchmarks help, too. We've picked a suite of games and applications that anyone can get access too, so that you – the reader – can easily compare your own gear with the kit we have in each issue. In fact, we'd recommend to all our readers that they run all of these tests on their systems and save the results, so you can always have a familiar benchmark of your own to compare to the latest gear in Atomic.



Our shiny Alienware-powered Gaming Lab, where we do most of our game reviewing and peripheral testing.



CPU Benchmarks:

Hexus PiFast

<http://pifast.hexus.net/pifast.php>

PiFast is a program that essentially calculates pi to a set amount of decimal places. It is a single-threaded application (one core/thread) and we run it at ten million places (10, 000, 000) using the Chudnovsky method, in the standard mode with no compression, and a FFT length of 1024kb. The program is free, so grab it and run it on your CPU. Memory bandwidth plays a significant role in the final performance of this program, so be sure you bump up the frequency as well as the CPU clock!

wPrime

<http://www.wprime.net/>

"wPrime uses a recursive call of Newton's method for estimating functions", says the website as it attempts to explain in plain English what it does. What it does do is, essentially, complex square rooting and other number functions, which are able to be split up evenly between multiple cores, or simply run on a single core. We use wPrime 32M in both single and multi-threaded runs. The results of the single run are divided by the results of the multi run, and this gives us the efficiency of the CPU being tested – very useful knowledge to have when comparing chips and evaluating the benefits of overclocking.

GPU Benchmarks:

Crysis

<http://www.ea.com/crysis/>

Crysis is one of those games that can scale from Average Joe's rig all the way to the beastly Dream PC in Kitlog; but due to recent graphics card releases we needed to bump it up a notch. Our testing now uses a standardised timedemo run, with all settings on high at a resolution of 2560 x 1600. While we can't run any antialiasing at this res and still get playable framerates on most cards, it's still more than enough to really give cards the workout they truly deserve.

Lost Planet 2

<http://www.lostplanet2game.com/>

Lost Planet 2 from CAPCOM may not have been a big seller, but its technology is a great implementation of DirectX 11 in version 2.0 of Capcom's existing MT-Framework game engine. It forms part of the atomic benchmarking suite due to its use of tessellation and other features in an actual game setting. Our tests use the freely available benchmark version of Lost Planet 2 and are run fullscreen at 1920 x 1200 with 8x antialiasing and 8x anisotropic filtering. Tessellation is set to Maximum and all the other settings cranked right up. Results are given in frames per second.

Cinebench R10 x64

http://www.maxon.net/pages/download/cinebench_e.html

Cinebench is a stalwart benchmark, and is one of the more entertaining ones to watch. It focuses on rendering an image at 800 x 600 resolution, complete with ray-traced light effects and much more. It can be run in either singlethreaded or multithreaded mode, and efficiency is calculated the same way as for wPrime. The program also supports up to 16 threads in total, and even eight threads with Nehalem is an impressive sight to see. The difference in performance between 32- and 64-bit is minimal – just keep that in mind if your results for the same setup are slightly different.

Everest Ultimate Edition

<http://www.lavalys.com/>

Everest is a system information tool that monitors voltage, temperature, as well as reporting on a massive list of other areas of your system. Hardware and software are noted here, but perhaps the most useful part of this program is the memory benchmarks. Ready for the fastest of dual/tri-channel memory, this tests the read and write bandwidth as well as latency. The program is a small download, but keep in mind that you only get a thirty day trial until you purchase the full version – something recommended if you're into getting the most info about what your tech is up to.

Unigine Heaven 2.1

<http://unigine.com/products/heaven/>

A synthetic benchmark built specifically to harness the latest and most demanding features of DirectX 11, Heaven is one of the best ways to test a card's tessellation capabilities. With a built-in timed run around a fully realised world, this benchmark taxes cards significantly and puts them under serious stresses. We test at a resolution of 1920 x 1200 using 8x MSAA and 8x AF, completing two runs of the built-in benchmark. The first run is with tessellation set to 'extreme'; the other 'none'. This highlights how well the cards can handle DirectX11 features and what they'll be like in a game that doesn't use the effect.

3D Mark 11

<http://www.3dmark.com/3dmark11/>

It really wasn't that long ago that we were introducing readers to 3DMark Vantage, but the relentless pace of hardware creep has led to a whole new benchmark, 3DMark11. Designed to measure a PC's gaming performance this latest version makes extensive use of all the new features in DirectX 11 including tessellation, compute shaders and multi-threading. We test using the Extreme preset, which runs at 1920 x 1080(p); this is designed to push even high-end systems, so we feel it's indicative of exactly the loads Atomicians expect from their gaming rigs.

Intel Core i7 990X

Intel's fastest chip in the history of ever.

Street Price \$1279 Supplier Intel

Website www.intel.com

Specifications 3.46GHz hexa core; 32nm manufacturing process, 'Gulftown' core; 64KB L1, 256KB L2, 12MB L3; 25x unlocked multiplier; 130W TDP; LGA1366

Even with all its might, the P67 Express Chipset has limitations with the amount of bandwidth available for memory, PCIe expansion cards, and other I/O compared to X58. The X58 Express chipset may have a bandwidth advantage, but the CPUs available for its accompanying 1366 pin socket are looking quite meek in comparison to the lesser 1155 pin socket.

Most enthusiasts opt for a single card in their system to avoid the oft-unreliable scaling of multiple card FPS. Those that take the plunge keep it at two cards, or purchase a dual core card such as the HD6990 or GTX 590; this is perfectly fine on the P67 platform. On the other hand, there's the minority who want the very best – quad SLI/Crossfire, triple channel memory, and enough cores to put small supercomputers to shame. For them, Intel has introduced a very special beast – the Intel 990X.

While the popular (and affordable) Socket 1366 CPUs are fabricated on the 45nm node size, the newer 1155 processors bask in 32nm glory. The result is a significantly higher overclock ability on the latter, with lower voltages, heat output, and overall energy consumption. You may recall that the Intel i7 980X (another Extreme Edition part) was also fabricated on the 32nm process. The i7-990 is a direct evolution of this.

Six cores are contained within the familiar nickel/copper HES, each with access to a 12MB pool of 'Smart Cache' (L3 cache). The default clock rate has been increased from 3.33GHz to 3.46GHz (a mere multiplier increase from 25x to 26x) compared to the i7 980X, with the same fancy stock cooler which isn't particularly good (although spectacular compared to what you get with non-EE parts). Turbo mode is made

available to boost the clock rate under load, up to 28x. Being an Extreme Edition CPU, this multiplier is unlocked, allowing us to go nuts when pushing this processor to its limits. And go nuts we did!

We didn't hesitate to drop the 990X into our test rig and ramp up the clocks. A 32x multiplier was our first port of call, which provided 4.256GHz of raw power to muck around with. That was quite stable at 1.35v without LLC, so we cranked up the multiplier a couple of notches where we managed a stable 4.522GHz with vcore bumped up to 1.4v.

Taking it a step higher required Level 1 LLC (on our new G1. Assassin motherboard) to maintain the 4.66GHz speed. This level of load line calibration reduced voltage discrepancies slightly, with vDroop reported by CPUz to be 1.36v. Level 2 LLC at this voltage produced 1.39v under load.

At this stage we wanted to try our hand at 5GHz, in order to match our menacing 2600K. To our dismay, we couldn't get it stable (we even tried 1.6v - shh don't tell!).

4.8GHz was our highest stable clock, albeit at an excessive 1.481v and Level 2 LLC. To put this into perspective, our previous runs with an i7 980X attained 4.4GHz (at a comfortable 1.41v, mind you).

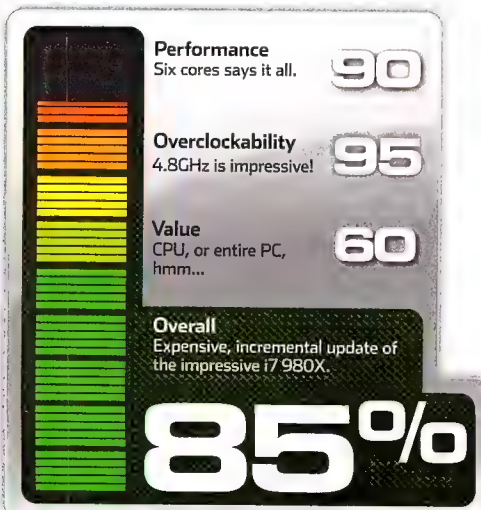
It goes without saying, six cores at 4.8GHz and triple channel memory is one heck of a powerful set up. It's hot too, reaching 90c under load with our Noctua NH-D14 attached, yet amazingly cool at idle with temperatures reported at 28c.

The i7 990X blitzed PiFast, wPrime and CineBench multi-core tests. An interesting observation when compared to our previous 2600K runs is that a 5GHz Sandy Bridge processor edges ahead when it comes to single core tests. It goes to show, a CPU a quarter of the price can hold its own – now imagine if it had two extra cores!

While this is an excellent performer, the lavish price tag matches its status as a flagship chip. Overclocking the significantly cheaper i7 970, can generally get you a clock rate of 4.2GHz, and assuming 4.8GHz is consistently achievable on the X990, 600MHz of headroom and an unlocked multiplier is what you're paying for here. And that's a tough sell. VC

Intel Core i7 990X

	Intel 990X 133x36; DDR3-1600 9-9-9-24	133x36; DDR3-1866 10-10-10-24	133x32; DDR3-1866 10-10-10-24
PiFast	18.10s	18.02s	20.18s
wPrime 32M - single thread	27.17s	27.530s	30.714s
wPrime 32M - multi-thread (HT on)	3.714s (7.32x efficiency)	3.744s (7.35x)	4.165s (7.37x)
CineBench R10 64bit - single thread	6721	6815	5986
CineBench R10 64bit - multi-thread	37771 (5.62x efficiency)	38407 (5.64x)	33561 (5.61x)
Everest Read	14362MB/s	15299MB/s	15187MB/s
Everest Write	9180MB/s	9561MB/s	9487MB/s
Everest Latency	56.2ns	54ns	54.5ns



GIGABYTE G1-Killer G1.Assassin

The return of the turbo button fo' realz.

Street Price \$560 Supplier GIGABYTE

Website www.gigabyte.com.au

Specifications Socket 1366; Intel X58 Express chipset; XL-ATX form factor; 4 x PCI-e x16 (2 x 16x, 2 x 8x electrically); 2 x PCI-e 1x; 1 x PCI; 6 x SATA2, 2 x SATA3; DDR3-2200

Gaming has nabbed another victim, and no, it's not an addicted WoW player on an extended binge. GIGABYTE has come to the table with a new range of appropriately named G1.Killer motherboards. The Assassin model in our hot little hands resides at the top of the range... with a matching price to boot!

The very first thing that jumps out when spying the board's bits is the lack of onboard controls. Debug displays, on/off buttons, CMOS reset button – all absent. Unlike ASUS's ROG range, which mash their audience of computer enthusiasts with hardcore gamers, the G1.Killer range isn't an enthusiast brand at heart.

Naturally, overclocker oriented bits and bobs aren't a deal breaker for many, particularly if the board is capable of providing clean power, an abundance of I/O options, or other extra goodies such as a Creative X-Fi sound solution, and a single Bigfoot Killer E2100 NIC powered Gigabit connection. Yes, GIGABYTE has gone to town with the green fella to source parts which appeal to gamers. We like the idea of having a sound card built in; it saves a PCIe slot, and provides clean audio straight out of the box. On the other hand, it's more susceptible to noise and has limited connectivity (no 6.5mm TRS connections here). But when compared to the typical Realtek solution, there's no competition.

Killer NICs have been largely ignored by enthusiasts because of the limited gains they provide versus the price. For the uninitiated, the main premise of the device is that it handles the processing of network traffic without offloading work to the CPU. In theory, this should provide performance gains in games; in practise, buy a better GPU instead. It also claims to improve pings by bypassing the Windows Network Stack,

and is capable of processing BitTorrent load on its NPU. Having the Killer E2100 integrated into the motherboard eases the otherwise exuberant price.

Connectivity on the G1.Assassin is somewhat lacklustre for the price point. Four USB 3.0 and four USB 2.0 ports adorn the I/O panel. Audio connections are the standard deal: 3.5mm TRS connections for surround setups, and an SPDIF out. For nostalgic reasons the good ol' serial mouse/keyboard ports make an appearance.

Speaking of nostalgia, GIGABYTE bundles a handy little 5.25in bay that features a further two USB 3.0 ports, an eSATA/USB2.0 port, and get this: a turbo button! Okay, so it's not labelled as such, but it looks, feels, and acts like one – squееее!

Expansion options include four PCIe 16x slots capable of powering four-way CrossFire and three-way SLI configurations, a standard PCI slot, and two PCIe 1x slots. Fortunately, the layout and sheer size of this motherboard means you can install cards of varying bulkiness with no trouble. In fact, our massive Noctua NH-D14 can be installed alongside triple channel memory installed without causing a fuss. Interestingly, two

8-pin power connections are required for CPUs with large power draw (130W+).

Equipped with the 16 phase power design and the latest F3d beta BIOS, we took to the G1.Assassin to see how far it could push our latest victim – a shiny Intel X 990. First we raised the unlocked multiplier to 34x for an admirable 4.522GHz, with standard LLC and 1.35v Vcc. This proved stable, despite the significant vDrop/vDroop (1.36v/1.31v respectively). After a bit of tweaking, we settled on 4.8GHz as our highest stable clock, but at a cost of borderline insane voltages (1.481v) and Level 2 LLC (1.472v load/idle). A great effort overall.

When it comes to dropping a wad of cash on a motherboard, you expect to get your money's worth. While inbuilt audio and NIC solutions are pricey individually, it's worth asking yourself if you're merely justifying the price, or whether you genuinely need these added features. As a whole, the package is impressive, but offers few, if not less, enthusiast features over a standard midrange X58 board. You'll also need to find a large enough case to put it in! **VC**

GIGABYTE G1-Killer G1.Assassin

Intel X990	133x36; DDR3-1600 9-9-9-24	133x36; DDR3-1866 10-10-10-24	133x32; DDR3-1866 10-10-10-24
PiFast	18.11s	18.02s	20.20s
wPrime 32M - single thread	27.19s	27.534s	30.717s
wPrime 32M - multi-thread (HT on)	3.714s (7.32x efficiency)	3.744s (7.35 x)	4.165s
CineBench R10 64bit - single thread	6717	6810	5981
CineBench R10 64bit - multi-thread	37771 (5.62x efficiency)	38407 (5.64x)	33561 (5.61x)
Everest Read	14353MB/s	15294MB/s	15181MB/s
Everest Write	9170MB/s	9557MB/s	9481MB/s
Everest Latency	56.3ns	54ns	54.6ns

Performance

Overclocks with the best of them.

90

Value

Audio/NIC is great, but expensive.

75

Features

Where are my onboard controls?

85

Build

Sturdy, good layout, but massive!

90

Overall

An interesting and elaborate twist on the E-350.

85%

AMD RADEON HD 6990

AMD runs rings around NVIDIA, holding on to the fastest video card in the world tag for another generation.

Street Price \$849 **Supplier** AMD

Website www.pccasegear.com

Specifications 40nm; Dual GPU; 830MHz Core; 4GB 1250MHz GDDR5; 'Antilles' design; 450W maximum TDP (overclocked); Dual PCI-E 8-pin power; Dual height, 30cm long.



Once upon a time AMD would have led this generation of hardware with the launch of the RADEON HD 6990. This is its flagship card, a dual-GPU beast formerly codenamed Antilles that we have been waiting for forever since the rollout of the 6000 series began. It's the first graphics card capable of knocking over the previous generation 5970, which held the crown of fastest card since its launch in late 2009.

The 6990 ships with both GPUs clocked at 830MHz and memory at 1250MHz. AMD has opted for a total of 4GB of GDDR 5 on the 6990, arranged in 2GB chunks that connect via a 256-bit memory bus. One unique thing about the 6990 is that AMD has included twin BIOSes on these cards. Flick a small switch on the top of the card and the card automatically overclocks, cranking the core speed up to 880MHz and the voltage from 1.12V to 1.175V. It also voids your warranty, although with the efforts put into power regulation on the 6000 series we wouldn't expect this simple switch to fry the card.

Much like NVIDIA has based its dual GPU GeForce GTX 590 around two GF110 chips, AMD has employed a couple of Cayman GPUs on this card. These are effectively downclocked RADEON HD 6970 GPUs, each with 1536 shaders. These GPUs use the updated VLIW 4 shaders that replaced the VLIW 5 ones used last generation. They sit alongside newer generation tessellators that have closed the gap with NVIDIA's Fermi architecture, and are paired with new power management chips designed to clamp GPU performance to TDP. This means that performance drops when a program like Furmark puts unrealistic strain on the GPU.

The downside of using such powerful GPUs is that the card draws around 375W in normal

mode, and 450W with the overclock switch flicked. Because of this you'll need a serious PSU with twin 8-pin PCI-Express connectors.

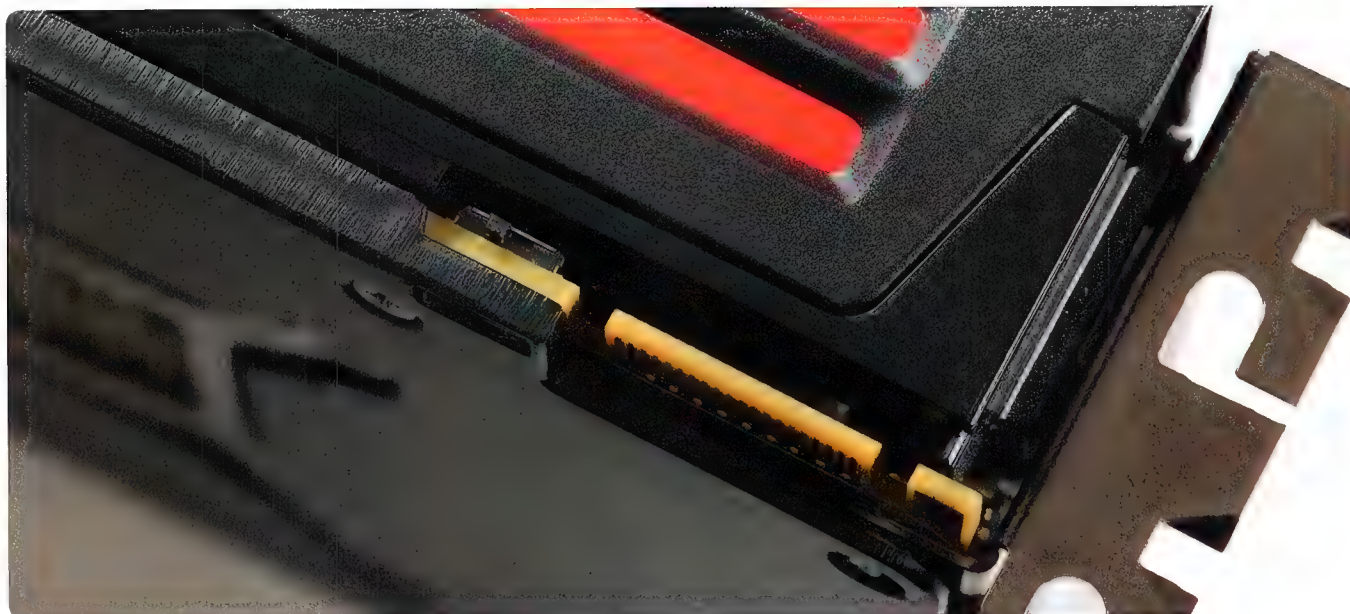
As is often the way with ultra high-end graphics cards all of the products out there at the time of writing used AMD's reference heatsink design. This is an evolution of the blocky vapour-chamber-based coolers used on the rest of the 6000 series, but this time it has two vapour chambers, one for each GPU. The fan sits in the centre of the 30cm long card, pushing air over both cores. This means that while it's exhausting air from one out of the rear of the case, the other is venting inside. This is a similar design to that used by NVIDIA on the GTX 590, and means that you'll need to put some thought into extra cooling if you are using one (or two) of these monsters.

Display outputs are well worth mentioning too. The 6990 continues AMD's trend of packing the cards with DisplayPort outputs. There is a sole DVI port on the card, with four mini-Displayport connections as well. Thankfully AMD ships the somewhat esoteric and expensive adaptors that you need to run three DVI displays.



Comparison Table

	RADEON 6990	RADEON 6990 OC mode	RADEON 6970	GeForce GTX 590
Transistors	2 x 2.64 Billion	2 x 2.64 Billion	2.64 Billion	2 x 3 Billion
Process	40nm	40nm	40nm	40nm
Core Clock	830MHz	880MHz	880MHz	607MHz
Stream Processors / CUDA cores	3072	3072	1536	1024
Memory Clock	1250MHz	1250MHz	1375MHz	853MHz
Memory Bus	256-bit	256-bit	256-bit	384-bit
Memory Amount	4GB	4GB	2GB	3GB
Maximum TDP	375W	450W	250W	365W



Any more than three and you'll need to be using Displayport monitors.

We were fortunate enough to get our hands on two RADEON HD 6990 cards for our testing, so we haven't just looked at single card performance. AMD has been going great guns with its Crossfire scaling of late, especially compared to the relatively poor scaling of NVIDIA's cards in SLI.

Our testing was done using a Core i7 2600K, 4GB DDR3 and an ASUS ROG Maximus IV Extreme motherboard. We used an Antec 1200W PSU in order to supply enough juice to run two 450W cards as well as the rest of the system. We ran through the standard array of Atomic benchmarks, however due to time constraints we weren't able to overclock beyond the basic switch method. We have compared the results to NVIDIA's GeForce GTX 590, which is the main competitor to AMD's flagship.

If we look first at Unigine Heaven we see some absolutely fascinating results. AMD has done well updating its tessellators in the 6970 and 6950 cards; the 6990 managed the same 47fps at extreme detail as the GeForce GTX 590 (when two 6990s were used the score jumped to 85.7fps). This is indicative of the 6990

generally having more performance than NVIDIA, but it negates the big tessellation advantage that NVIDIA has held until now. With tessellation disabled the 6990 managed 106fps to the GTX 590's 76fps, a healthy lead in performance.

Even though Crysis 2 has finally been released, we aren't yet sold on it as a benchmark. For now we're sticking with Crysis, which still provides one of the most intensive examples of games currently on the market. In our standard timedemo the 6990 scored 85.87 fps. Crossfired 6990s only managed 20 frames more than that, with 105.67fps, indicating that Crysis is much more CPU than GPU bound at our standard settings. As contrast the GeForce GTX 590 got 79.02 fps and the GTX 580 pumped out 55.61fps on this test.

3DMark11 again showed how well Crossfire is scaling nowadays. A single 6990 scored x3277, while two of them managed x5162, roughly 1.6x the performance. As a contrast the GeForce GTX 590 got x2977, while the GTX 580 gets x1938 in the same test.

Simply put, the RADEON HD 6990 is the fastest graphics card you can get. Even the pinnacle of NVIDIA's efforts, the GeForce GTX 590 can only manage a tie in its pet benchmark.

But while the performance is indeed impressive, it is pretty much overkill for the standard PC setup. To really get the most out of this card you'll need to be running well above the 1080p 60Hz that most monitors limit you too. You'll either want to be running a 120Hz screen or be taking advantage of AMD's EyeFinity multi-screen technology.

Now that we've benchmarked it, we can say that the RADEON 6990 is worth the wait. Not only does it impress architecturally, it takes advantage of the work AMD's doing on crossfire to deliver great performance scaling (we'll likely see the other fruits of the crossfire work once AMD releases its mainstream Llano APUs at Computex). It beats the GeForce GTX 590 hands down, and at the time of writing was significantly cheaper to boot. It is still a \$700 graphics card, but if you have the monitor/s to take advantage of the performance then you'll likely not want for a new Graphics card for some time to come.  JG

AMD RADEON HD 6990 Synthetic Benchmarks

Unigine Heaven, FPS Tess - 47

Unigine Heaven, FPS Tess - 106

3DMark 11 - x3277

Score

AMD RADEON HD 6990 Gaming Benchmarks

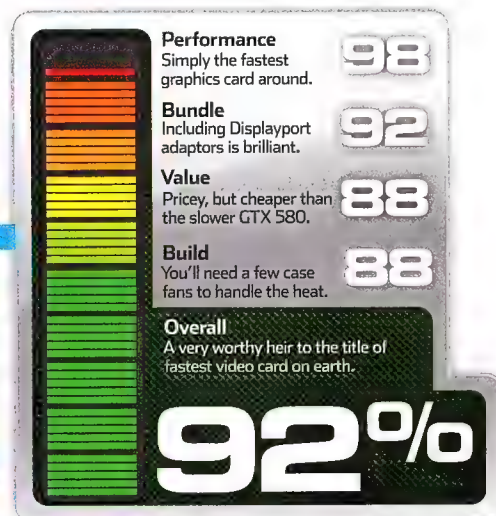
Avg - 85.87

Min - 61.76

Max - 103.7

= Reference scores: XFX 5850

Frames per second



ASUS GTX590

Nvidia says me too, we say too much.

Street Price \$990 Supplier ASUS

Website www.asus.com.au

Specifications 613MHz core; 855MHz memory (3414MHz effective); GF110 cores; 2 x 512 unified shaders (CUDA cores); 3072MB GDDR5; 2x384-bit bus width; dual slot active cooling; dual 8-pin PCIe power connections; 11.5" length

Card info <http://www.techpowerup.com/gpuz/cenur/>

13% OC



What's a GPU war without two powerful rivals battling it? AMD struck first with 'Antilles', a dual GPU solution better known as the HD 6990. Meanwhile, Nvidia had its own plans underway in the form of a dual Fermi (GF110 core, naturally) card that boasts 3GB of GDDR5 memory (1.5GB per core). Essentially, it's two GTX580s shoved together with their clock rates tamed to ensure that temperature and power requirements stay somewhat sane. By sane, we mean a Thermal Design Power (TDP) of 365W, so perhaps that line was crossed a while back.

ASUS's take on the GTX590 comes equipped with all the peripherals you'd expect it to – a dual 6-pin to 8-pin cable, a DVI to VGA adapter, and a DVI to HDMI adapter. These compliment the three dual-link DVI-I ports, and a single mini DisplayPort. No portion of the I/O plate is left empty; any given area either houses a port, or has a hole cut into it to for hot air to flow through.

And boy does that hot air flow! Nvidia has learnt that loud cards are unpleasant, which explains why the cooling solution on the reference design ASUS card is rather conservative. Under 100 per cent load, the fans stayed at 40 per cent, maintaining a surprisingly reasonable 78c. However, the shroud is sealed well around the card, so placing your hand on

or near the vent is met with very warm results.

We should also mention that this card reeks of burning under load – it's not the infamous 'magic smoke' smell, but it can't be healthy.

Perhaps it's just us, but a hot dual-core card with a massive TDP just begs to be overclocked. Afterburner, and ASUS's own SmartDoctor decided that we weren't entitled to voltage adjustments, so we were stuck with the stock 0.938v. So much for cooking with gas – but we channeled the spirit of MacGyver and made do with what we had. Our result after much fiddling was 690Mhz on the core, 1380Mhz on the shaders, and 885MHz on the memory. Not too shabby.

Benchmarks followed, which saw an intriguing result in Crysis. While the average and maximum FPS increased by about three, the minimum dropped by this same amount. Fortunately our

other tests were free of such oddities – Lost Planet 2 gained 13 FPS, Unigine Heaven's extreme tessellation setting saw a 4.5 FPS increase, with the no tessellation test boosted by 8 FPS. Finally, 3DMark11's performance run raised 834 points, and 'extreme' 267 points. Overall, this card performs brilliantly.

It's worth noting that the noise level of the card during benchmarking didn't exceed 58dB, and that's after being overclocked! Stress testing did push it to 61dB with a maximum temperature of 81c. Quite impressive, but we're not so sure that the second core was doing much.

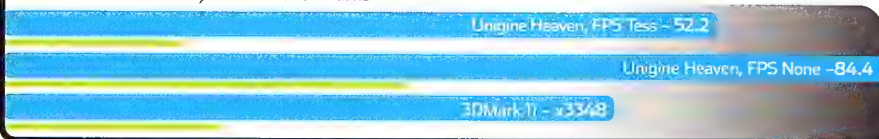
If it came down to choosing between the HD6990 and the GTX590, and both were priced equally (which they aren't), we'd go for the latter – purely because it's so quiet. However, the \$150 premium is a lot of money to part with, especially given the total cost. One will always purchase a dual-core card at a significant cost, but which is more valuable, the comfort of a quiet machine, or a fatter wallet?

If you're looking for multi-card performance in a small package, and price is no object, then this may well your best bet. Otherwise, consider the HD 6990, or grab a high end single core card such as the GTX 580 or the HD 6970. VC

ASUS GTX590 Ambient readings

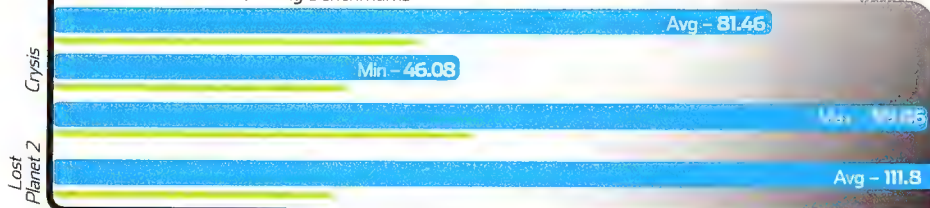


ASUS GTX590 Synthetic Benchmarks



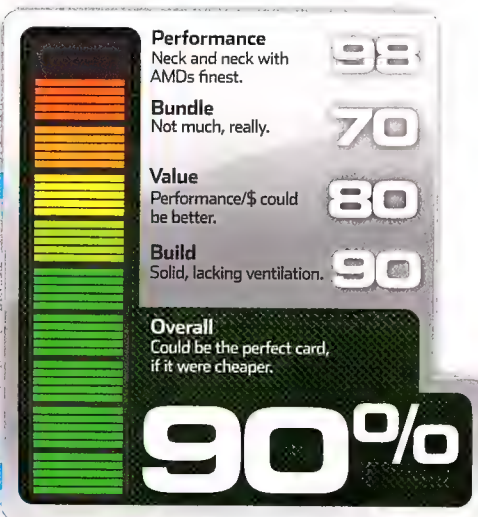
Score

ASUS GTX590 Gaming Benchmarks



= Reference scores: XFX 5850

Frames per second



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ASUS DIRECTCU II GTX580

A green mean gaming machine.

Street Price \$645 Supplier ASUS

Website www.asus.com.au

Specifications 782MHz core; 1002MHz memory (4008MHz effective); GF110 core; 512 unified shaders (CUDA cores); 1536MB GDDR5; 384-bit bus width; triple slot active cooling; dual 8-pin PCIe power connections

Card info www.techpowerup.com/gpuz/b7xry

17% OC



They say bigger is better, but when it comes to video cards, one may be forgiven for thinking otherwise. That said, ASUS' DirectCU II GTX 580 isn't your typical high end card, consumes three entire slots with its bulkiness.

Attached to the black PCB is the new and improved GF110 Fermi core. Gone are the struggles of excess heat caused by leaky transistors, but the raw performance and superior tessellation capabilities remain intact.

But with great power comes great need for heat dissipation, and by golly does this card have a serious cooling setup. Two aluminum radiators connected by five copper pipes extract heat from the core, where two fans push air to cool the beast. Temperatures were reported at a meek 30c idle, and 78c load, with noise levels reaching 59.7dB during Furmark tests.

With Afterburner set to push 1.15v through the core, we tweaked it and the shaders until our stable maximum of 918MHz/1836MHz was found. The observant reader may have noticed that the core and shader clocks are linked on this card, and, in fact, every card in the 4xx and 5xx series. Memory was also pushed to 2354MHz according to Afterburner, which in reality is 1177MHz (4708MHz effective).

Temperatures rose considerably at these clock rates with the card reaching 97c under Furmark, with the fans kicking into 100 per cent speed to

prevent the temperature rising any further, and a resulting 79dB of noise. During our benchmarks (designed to emulate real world usage) the noise level peaked at a more comfortable 53.7dB.

Bundled with the card is an 8-pin to 2x 6-pin power connector, a Crossfire bridge, and a DVI to D-SUB adapter. Despite having three slots of I/O plate to fill, connectivity is fairly standard, with 2 x DVI, DisplayPort, and HDMI connections.

During installation we noticed quite a bit of flex in the backplate of the PCB. With the GPU core being where it is, the radiators and plastic shroud felt the need to wobble. That card won't

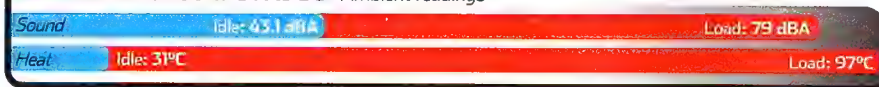
fall apart in your hands (we hope), but it's a design oversight. When it comes down to raw

performance, the GTX580 is up there with the best. Crysis runs at a comfortable 64.33 FPS on average, and Lost Planet saw a jump from 58.5 FPS to 67.2 FPS after the overclock. Unigine Heaven does well in both extreme and non-tessellated tests, with 'playable' framerates. Finally, we've got the new 3DMark11 benchmark tool for your synthetic-and-completely-unrealistic comparison needs – check out the results in the table below!

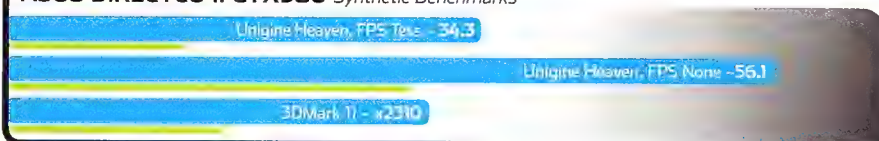
ASUS has created some great cards, but this model has us scratching our heads. We'd understand the need for a three slot design, had this been a previous generation Nvidia core, but we can't help but think that a similar solution in a smaller form factor should be possible.

For about an \$80 premium over a standard GTX580, you get a card with a loud but effective cooler and a mild overclock out of the box. It's a respectable card, but we can't help but shift to stingy mode with this one. **VC**

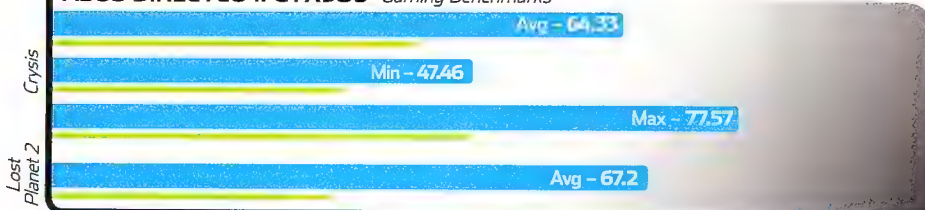
ASUS DIRECTCU II GTX580 Ambient readings



ASUS DIRECTCU II GTX580 Synthetic Benchmarks

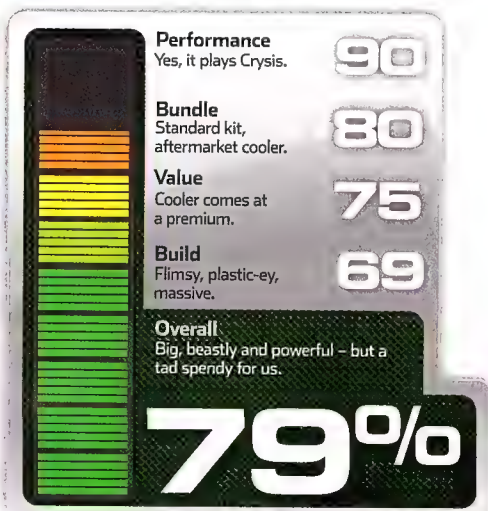


ASUS DIRECTCU II GTX580 Gaming Benchmarks



= Reference scores: XFX 5850

Frames per second



ASUS Xonar Xense

A combo soundcard and headset package? This should be interesting...



Street Price \$365 Supplier ASUS

Website www.asus.com.au

Specifications Signal-to-noise (A-Weighted): 118dB for Front Channel; Frequency Response: <10Hz to 46KHz (-3dB); Headphone Impedance: Optimised for 32-600 Ohms Output THD+N at 1KHz (-3dB): 0.00039% (-108dB) for Front Channel Audio Processor: Asus AV100 (Max 192KHz/24bit); 24-bit DAC: Texas Instruments PCM1796 for Front-Out, Cirrus-Logic CS4362A for other 6 channels;

Headphone Amplifier: Texas Instruments TPA6120A2; Bus Connectivity: PCI Express x1; Driver Features: Dolby Digital Live, Dolby Headphone, Dolby Virtual Speaker, Dolby Pro-Logic II



Supporting chrome EMI shielding, some very unusual heavy-grade outputs, a built in headphone pre-amp and a dedicated power source, the Asus Xonar Xense has smashed its way out of the cage and onto the Atomic test bench. This card has a few differentiators going for it. Does it stand up to a serious set of ears and demanding 192kHz, 24bit audio, though?

We popped Crysis 2 in, and plugged the very comfortable Sennheiser PC 350 series cans into the gold finished 6.35mm jack outputs of the new Asus board. Instantly, our mind was emptied of all but one solitary word. Loud. This was rattling the very core of the Atomic audio testing district. The drivers in these headphones output far more than our little ears could take, and with perfect (perceived) clarity, too!

The package you get is fairly tightly integrated. The PC 350 headphones have their own profile inside the Asus control panel for impedance and gain matching. The PC 350 headphones are a 150-Ohm unit. The Xense will allow for Ohm settings of up to 300, however, suggesting this card was made with high end, high gain headphones in mind.

Which the PC350s aren't quite. They are vibrant, relatively transparent, punchy and loud with a nice spread of low, mid and high colours on the sound stage, but they aren't something you'd compare to a set of Sennheiser HD 650s.

The Asus Xonar Xense card however, is a different matter entirely. We plugged it into

our usual reference speakers and were shocked by what we heard. Above and beyond the Creative X-Fi Titanium HD, and then some. We took apart this glistening monument to sound and peeled off the shiny exterior using RightMark's Audio Analyser, as per usual.

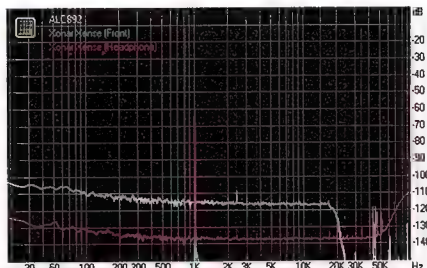
RMAA scored a solid set of sixes across Frequency Response, Noise Level, Dynamic Range, Total Harmonic Distortion, Intermodulation Distortion, and Stereo Crosstalk. We've not seen a sound card do this before, nor do we expect Creative to rest on its laurels too long before they produce a card capable of this also.

So the question is, where does this leave us, in terms of what this card represents? It's a weird mixture of things. If you want very serious sound from your PC, and you have a set of speakers and amplifier that can justify 192kHz resolution @ 24bit (and your content is of sufficient resolution and bit depth!), you might consider this the focal point of a very serious HTPC. It's a highly potent and effective replacement for an expensive receiver. We blew some 24bit content through the Xense, and it certainly delivered on our Tannoy Reveal reference monitors.

For gamers, we're left wondering. This card is a no-brainer if you want the very best that money can buy in terms of audio resolution, sampling quality, total harmonic distortion et al. That being said – it's not actually that cheap, even with the arguably very good PC 350 headphones. Sure, they are good, but pairing these cans with this card leaves us wanting more. To experience this card in all its glory, you easily need a set of HD

600s, or a very high end set of speakers. In this respect, perhaps ASUS missed the mark in the matching of card to cans. That said, we cannot begrudge Asus for providing a complete value package.

The bottom line is that we can recommend this card to audiophiles and those that want the very best pristine audio from their PC. We can recommend the PC 350 headphones too, for gamers that want arguably one of the best gaming headsets out there. We can't recommend them together however, if you have a foot in both of these encampments. Maybe it's for the best that ASUS will shortly be offering the Xense as a stand-alone product. We'd buy the card in a heart beat, and add our own very sweet headphones. For time being, Atomic has a new king of sound cards, irrespective of the package eccentricities. **JC**



RMAA shows us amazing dynamic range, THD and stereo cross talk figures.

Overall
It's an odd package, but the card alone is awesome.

90%



TURTLE BEACH®

LET THE REVOLUTION BEGIN!!

EAR FORCE® Z2

Professional-Grade PC Gaming Headset

Turtle Beach's Ear Force Z1 and Z2 deliver high-quality sound, rugged construction and superior comfort in a compact design that's easy to carry along with your gaming gear. Built for gamers "on the go", the Z headset range delivers big sound in a small package – and at a great price.

Full-sized premium speakers bring out every detail in the game so you can react quickly to sound cues. Specially designed sound-absorbing cushions sit comfortably on your ears and help block out distractions like PC fan noise or chatter from other gamers. Twist-style ear cups can turn flat and rest on your chest while you take a break from the game.

The Ear Force Z1 and Z2 let you enjoy the comfort, quality and competitive edge of a professional-grade gaming headset wherever you go.



EAR FORCE® Z1

Noise-Reduction PC Gaming Headset



EAR FORCE X41



EAR FORCE X31



EAR FORCE X11



EAR FORCE XLC



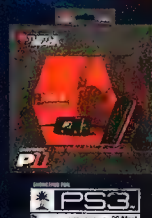
EAR FORCE PX5



EAR FORCE PX21



EAR FORCE P11



Turtle Beach has a headset to suit every level, from basic headsets right up to programable wireless 7.1 Dolby surround sound!

To view the entire range and their extensive list of features and to buy online visit...

www.turtlebeachheadsets.com.au

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Talk to the Experts

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GAME
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www.fiveight.co.nz

Sennhieser 333D G4ME1

A well-featured set of cans backed up by great sound.

Street Price RRP \$289 **Supplier** Sennheiser
Website www.sennheiser.com

Specifications Frequency response: 14 – 22000 Hz;
Impedance: 32 Ω ; Sound pressure level (SPL): 112 dB;
3.5m cable (total); 255gm.

There seems to be a wave of seriously featured gaming headsets coming out at the moment. Razer and ThermalTake have both taken aim at the market with mixed success. Creative's delivered some good work, but, again, not quite perfect. So now we have Sennheiser, always well-renowned for its higher-end gear, making a play for the hearts and ears of gamers.

Is the company on target? Pretty much.

If you'd asked us before we'd seen the 333Ds if we thought it were possible to fit more features into a gaming headset, we'd have said no – and been proved wrong. The 333D features an in-line USB sound device to deliver Dolby 7.1 sound in 3D, but there's a lot more to these cans than that. The swing-down mic features an auto-mute when the mic is levered up and out of the way, and a flexible boom so that you can get it sitting just right no matter how funny shaped your noggin is. The opposite, right-hand enclosure houses a revolving volume control, much like old-fashioned iPods, which means it's easy to find the controls when you want to drop the sound



...the entire right-hand enclosure can swivel forward or back off of your ear, allowing for superior communications at a LAN...

out or blast it up; controls in line with the headset lead are handy, but can take a bit of hunting to find during an intense firefight. And that cable is super-long, too, as the 333D comes with an extra 1.3m extension, making for a total cable length of three-and-a-half meters with all parts – including the Dolby dongle thingy – attached.


Yes, that means not only can we make it all the way to our bathroom from our gaming rig at home, but even close to downstairs and into the kitchen – great for keeping the talk going during long MMO raids and late night sandwich missions! The Dolby widget itself features a neat little cable-lock to stop the 3.5mm jacks from slipping out during your peregrinations, too. This is a very well thought out package in terms how gamers are likely to use it.

But, possibly our favourite feature is that the entire right-hand enclosure can swivel forward or back off of your ear, allowing for superior communications at a LAN or amongst housemates – a very nice touch. It also means you get to look like a pro-DJ – if you're into that

kind of thing... Sennheiser picked this up by paying attention to the way many gamers keep one can off their ear for this very reason, so actually built it in. Clever.

Sound is the key, though, and thankfully the 333Ds deliver, despite the rather small enclosures. Music is crisp and clear across all ranges, while gaming delivers sharp dialogue, punchy bass and good, crackling gunfire. Movies, which so often combine all of the above, sound just as good. The Dolby 7.1 switch doesn't seem to bring much to the table, however, but we're still of the opinion that surround sound headsets in general are a touch... over-rated. Sure, it makes explosions sound pretty full, but everything else just sounds like it's happening in a big open room. If you happen to actually be in a big open room in a game, the effect becomes magnified to awkward levels. Despite being very comfy to wear, and almost impossible to shake off, the 333Ds get quite hot after a while, and caused us to sweat up a minor storm.

And now is where we get to the real sticking point – price. At just shy of \$300 retail (few units have made it into the retail channel yet; the price may drop on the street), these are very expensive. With the exception of the 7.1 functionality, you get what you pay for however, as these deliver great sound across the board and excellent build quality, along with features that any gamer might desire. But is that much cool stuff and good sound worth the dosh?

If you must have the best (and if so, Lord bless you, young gamer!), then we'd say that the 333Ds are your best bet. However, if sound's not your prime motivator in gaming, or if you're unlikely to be listening to music and movies as well as fragging, save some money and look elsewhere.  DH

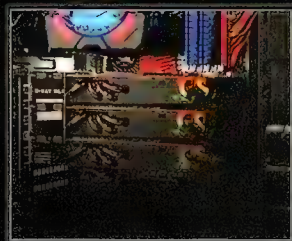
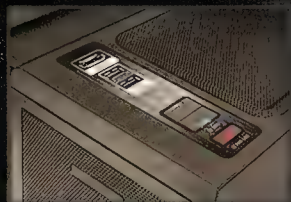




What the critics say:

"A case that makes a statement while providing premium features and build quality, the Level 10 GT has it all."

- 90% Atomic Magazine



Features

- USB 3.0 FrontSpeed
- EasySwap PitStop 5 HDD bays
- VGA TripleMax 37 cm (ATI Radeon™ HD 6870 & NVIDIA GTX 580)
- QuadFan power cool
- Triple Colorshift
- CableClear cable management
- Liquid Cooling Ready
- Smart-lock Security System (S.S.S.)
- Headset Holder

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Nexus 03 9663 9988
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Scorptech 1300 726 770

QLD

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Gamedude 07 3387 1531
MSY 07 3217 9070
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MSY 08 9344 1002
SA
MSY 08 8212 1656
PC DIY 08 8410 0446

Cubitek XL-Tank

A solid offering from Cubitek, but not quite an inspiring one.

Street Price \$200 **Supplier** Cubitek
Website Cubitek

Specifications 230 x 490 x 525mm (W, H, D); Front: 230mm fan x 1, Rear: 140mm fan x 1, Top: 140mm x 2; drive bays: External: 5.25in x 4 (one 5.25in to 3.5in converter included), Internal: 3.5in x 6 + 2.5in x 2; Anodised 5052 aluminium

Gallery www.atomicmpc.com.au/?249700

Cubitek's a new outfit to Atomican shores. Distributed locally by e-tailer M-wave, we've just started seeing some of the company's kit, and so far it's looking solid, if a touch unimaginative. We'll be working our way through the entire Tank range, and we're kicking off with the largest – the imaginatively named XL-Tank.

Built from solid and imposing black brushed aluminium, the XL-Tank's design is almost a statement in itself. There are no side-window panels or fancy moulding – this is case design cut from the Lian Li cloth. The only thing that breaks up the clean design of the top fascia is a drilled mesh exhaust, and the power and IO ports – of which there are the standard audio, an e-SATA and two USB3 ports that do the usual annoying pass-through trick. The power and reset buttons feel good and solid though, which is usually a sign of a solid build-quality.

The rear panel is untreated metal, which is bit of shame, but the front fascia is quite interesting. It features more drilled mesh, and the usual facing plates for drive bays, but what we really like are the small hex-nuts holding it all together. The case comes with an allen key, so that you can really tear the case apart. It's nice touch for anyone who wants to get to grips with case modding, or even just wants access to the entirety of the interior during installs and cabling.

The chassis itself is supported on four hi-fi-style metal feet, adding a touch of almost wood-panelled class to the design. The interior is as untreated as the backplate, but all very well finished.

There is one issue worth noting that's not immediately apparent. We had to be sent two Tanks for review, as some parts, like filter material on the intakes (which is advertised on the product website), were missing from our case. This was chalked up to the case being a review sample, but we were then sent a retail version, and... the same filter material was missing. It's a small oversight, but an annoying one.

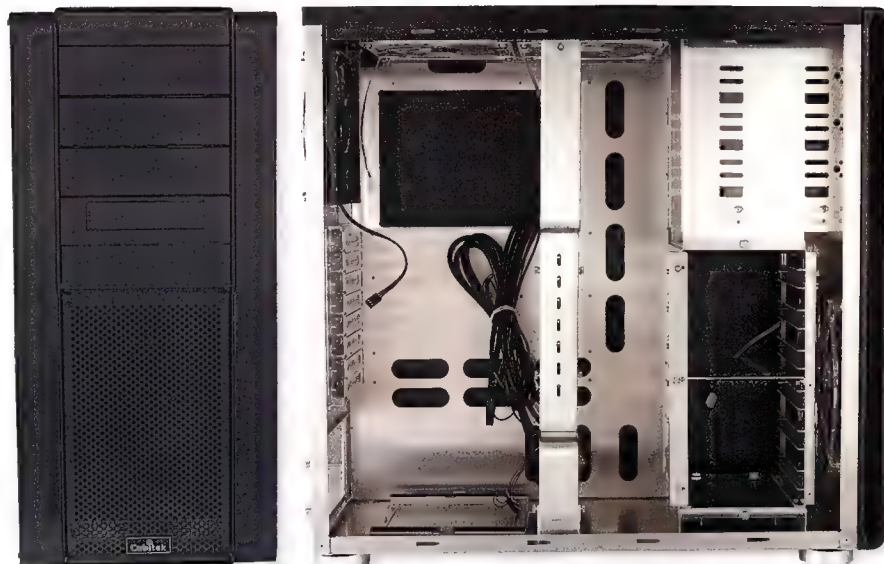
Everything else is pretty much as you'd expect at the price point. There are lots of cutouts for routing cabling through, and another cutout on the mobo plate for dealing with heatsinks. The PSU sits up on two rubber coated rails to help dampen vibration, while a similar service is performed by chunky little rubber grommets that fit onto your drives. The expansion slots use old fashioned thumb screws, which we always prefer when installing monster video cards. And speaking of which, the case boasts room enough for even the biggest, and support bracket to boot.

It's a breezy little number, too. A nice big 230mm fan at the front sucks air in while two



140mm fans on the top and single 140mm fan at the rear suck it out. The front fan passes air over the HDD bays, too, so they should be kept nice and ventilated by the arrangement.

Apart from the whole 'missing filter material' issue, the XL-Tank's a fair choice for those looking for a case that's more sturdy than fancy. It might be lacking in stylish touches, but if you're in the more austere camp when it comes to case design, this is a good option for you, with excellent cooling out of the box. **PH**



Build
Solid and imposing.

89

Value
A lot of fans; some neat features.

90

Cooling
More than adequate, and well-placed.

91

Features
A good mix of tool-less and screw-in options.

88

Overall
A big, well-featured choice.

89%

Silverstone Temjin Series TJ11

For definition of awesome, please see the entry for the TJ11 in your dictionary.

Street Price \$600 **Supplier** Altech Computers
Website www.silverstonetek.com

Specifications 224mm x 642mm x 657mm (W x H x D); 17.4kg; 2x 180mm fans (side), 1x 120mm fan (rear), 2x 120mm fans (bottom); 9x 5.25in drive bays, 6x 3.5in drive bays; 9x expansion slots; Aluminium body; up to XL-ATX motherboard.



You know that thing about love at first sight? When you clap eyes on to someone and know, instantly and in that moment, that they are the love of your life? Well, we're cynical here at Atomic and don't really believe in it – for people, at least. We believe in it pretty damn seriously when it comes to tech.

And Silverstone's new TJ-series case is just that. The TJ11 is our new one true love... at least until the TJ12!

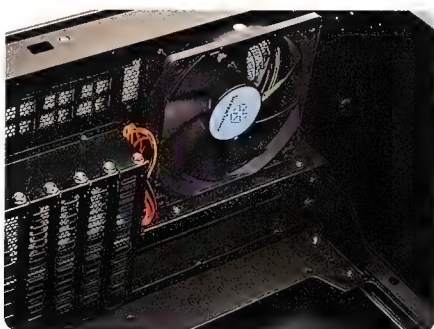
Sexy curves

Silverstone's been wowing us with what it calls its unibody design for years now, and the TJ11 is no different. Just about the first thing you notice is the single, elegantly curved piece of black, sandblasted aluminium that makes up the main part of the body. What this offers in terms of aesthetic cannot be overestimated – it simply looks a million bucks. On top of that, it makes for a fiendishly sturdy design, too. Which is handy, given that even without parts installed the TJ11 weighs in at over 17kg.

It needs to be sturdy!

Going beyond those killer curves, the first thing you notice is the slightly extruded fascia that wraps around the front and top the case. The front part of the case houses a mighty nine 5.25in drive bays, while the top part of those mounting features the subtly hidden IO ports, including two USB3 ports. These rely on an annoying pass-through cable, but the design of the TJ11 at least offsets this unsightly solution.

The side panels feature slanted mesh inserts for cooling, and two completely clear cut-outs about two-thirds of the way up from the bottom edge. What these are for, and the passthrough solution, become obviously once you remove part of the top fascia – the entire motherboard



mount is set 90 degrees from the standard orientation, just like in Silverstone's Raven series!

This means all the expansion slots and motherboard IO point straight up, but are hidden under a removable panel. This does a couple of things. First, it's very good for cable management, as all the trailing cables are naturally collected into a single bundle, or, in the case of the USB cables, hidden altogether. The second vitally important role this presto-change-o trick delivers is far better heat management; as heat rises, it naturally vents out of the top of the case.

And that's before you even begin to boggle at the excellent cooling setup within...

Cool body

The TJ11 divides up its interior into discrete thermal chambers, with discrete cooling sub-assemblies. At the bottom, you've got a roomy spot for a PSU, next to this sideways facing HDD bays. These feature a tool-less caddy mechanism, and all slot into hot-swap arrays for super-convenient drive fiddling. The bays face to the case's left (a user's right, if you're looking at it from the front), and have a pair of 140mm fans set behind them to pass over toasty drive platters. The caddies are a touch cheap-feeling, though, and can be tough to insert and remove. Watch these if you do a lot of swapping.

The rest of the case is a separate enclosure, with two large fans blowing air up into it. This is where those side-panel cut-outs come into play; each one also features a removable plastic mesh cover, which is great for dealing with dust intake. The single fan that acts as the system's exhaust means that internal air pressure is positive – which is another great anti-dust measure in an already dust-unfriendly case.

The 5.25in drive bays pretty much take up the entire front of the case, and make for one large

construction of the case; pretty much the entire thing's built using screws, so that each part can be removed/modded/folded/spindled/mutilated... you get the picture. If you just like neat installations, you'll even love the slide-out mobo tray, which clears the chassis itself with enough room to install every mobo component before replacing it.

Of course, few things are ever totally perfect. The case seems beautifully finished and milled, but there are obviously one or two

...the entire thing's built using screws, so that each part can be removed/modded/folded/spindled/mutilated... you get the picture.

cavernous space if all you really want in your system is a single optical drive. However, it offers some great options for higher-end systems. Our first thought was that this would make a helluva fancy mastering machine (for totally legal reasons, of course), but the TJ11 really comes into its own when you introduce watercooling into the equation. There's room for the largest of radiators, and even if you do want multiple optical devices, there's still heaps of room for front-panel temperature monitors, fan controls and more.

The TJ11 will also appeal to modders who want access to every component in the case. There's not a single rivet in the major

sharp patches – the bloody scratch we scored while getting up close and possibly a little too personal is evidence of that! And for all the compartmentalisation and use of screws and extra tech like the hotswaps, you pay a huge cost in case weight. There are whole systems, built and finished, that weigh less than the TJ11 does empty!

But, at the end of the day, there are few systems that can match the TJ11 for sheer space, cooling power, and sturdy construction. Some of the higher end Lian Li's come to mind, but there's just something about the Silverstone option.

It gets us. Right in our tech-heart.  DH



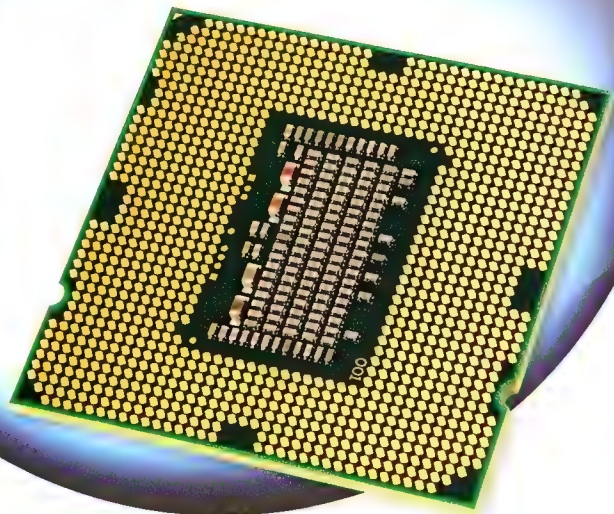
KITLOG

These are four of our basic systems, with something for every taste. **The Game Box** is put together with money-saving in mind, but also an eye to getting as much bang for buck. Our build has just gotten a little more expensive, but for that few hundred you're also getting cutting edge performance and one of the most overclockable chips you can get today.

It's great, it's broken, it's back...

Man, Sandy Bridge has been a hell of an awkward release, but by now boards should be coming back into retail and we can start getting on with all these planned builds that stalled back in January.

It really is the sweetspot in terms of price and performance. Of course, if price is no object... there's always the 990x on page 34...

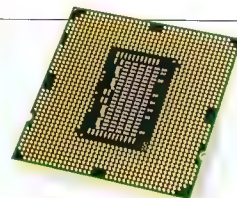


The Perfect PC, on the other hand, is the system everyone aspires to, with nothing but the best parts – without going crazy, though. It's a collection of all the greatest hardware that we'd pick without a budget, sure to impress with performance and sheer style.

Oh, and if you're wondering what the Ref IDs are, that's the ID of that article on our website. Just enter it like this – www.atomicmpc.com.au/?NUMBER – and you'll go straight to that review.

THE GAME BOX

CPU



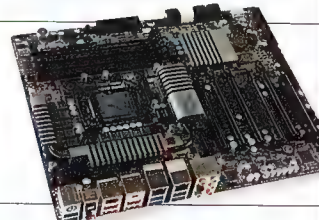
Intel Core i5 2500-K
PRICE \$290

Sandy Bridge's combination of cost and overclocking prowess is awesome.
Issue 122, Page 36

MOTHERBOARD

GIGABYTE P67A-UD7
PRICE \$365

A great P67 board with some nice features.
Issue 122, Page 46



MEMORY



G.Skill Ripjaws F3-10666CL7D-4GBRH
PRICE \$130

Great value, tight timings, and some flexibility.

VIDEOCARD

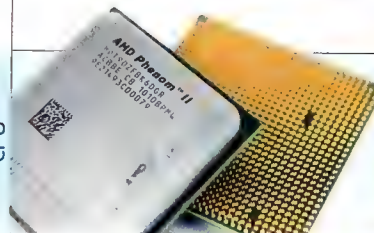
NVIDIA GTX460
PRICE \$245

A reference-design card, but plenty fast for gaming bliss.
Issue 116, Page 38



THE PERFECT PC

CPU



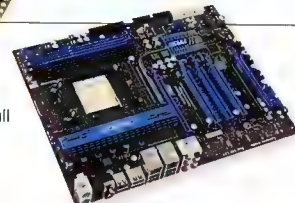
AMD Phenom II X6 1090T

PRICE \$355
Six cores of high-powered processing joy.
Ref ID: 220395

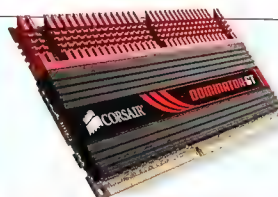
MOTHERBOARD

MSI 890FXA-GD70
PRICE \$265

A high-end AMD platform with full CrossFire support, great OC'er.
Ref ID: 221656



MEMORY



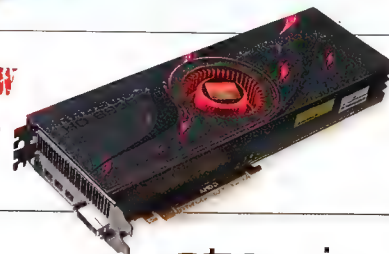
Corsair Dominator GT CMT4GX3M2A2000C8
PRICE \$220

Red-hot memory for dual-channel speed.

VIDEOCARD

ATI 6990 **NEW**
PRICE \$849

The new fastest video card on earth!
Issue 124, Page 36



For more builds check out the Kitlog E-mag at atomicmpc.com.au/kitlog

SUBTOTAL: \$1890



Coolermaster Hyper 212

PRICE \$45

Nice cooling for a very affordable price.

CASE



Antec Lanboy Air

PRICE \$220

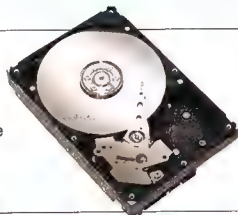
Unique looks and excellent cooling design.

Issue 120, Page 48

1TB HDD

PRICE \$90

A thousand gigabyte storage drive on the cheap.



KEYBOARD

Razer Arctosa

PRICE \$50

A cool-looking keyboard that'll serve you very well.

Ref ID: 149483



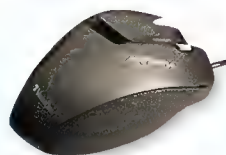
Viewsonic VX2233WM

PRICE \$215

21.5 inches of value-packed screen, great buy.

Issue 108, Page 42

MOUSE



Verbatim Rapier V1

PRICE \$65

Great gaming performance and nifty features.

Issue 96, Page 43

Plantronics Gamecom 777

PRICE \$80

Solid set of cans with great audio.

Issue 101, Page 41



Onboard Realtek ALC889A

A decent chip that does the job.

POWER SUPPLY

OCZ ModXStream Pro 600W

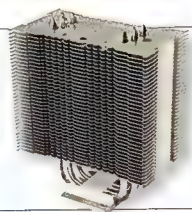
PRICE \$105

Plenty of wattage, reliable, modular for neatness.

Issue 109, Page 59



SUBTOTAL: \$5413



Noctua NH-U12P SE2

PRICE \$95

Two fans, quiet and nice overclocking capacity.

Issue 107, Page 48

CASE



NEW

Silverstone Temjin Series TJ11

PRICE \$600

Few can match the sheer space, cooling power, and sturdy construction.

Issue 124, Page 46

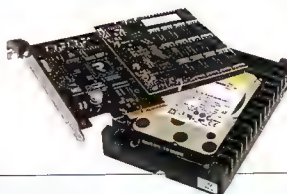
OCZ REvo Drive x2 & WD 600GB VelociRaptor

PRICE \$780 + \$400

Superfast SSD with zippy storage.

OCZ: Issue 121, Page 43

WD Ref ID: 220323



KEYBOARD

Razer BlackWidow

PRICE \$160

The new benchmark in gaming quality.

Issue 122, Page 50



Dell U2410

PRICE \$699

In-Plane Switching, 1.07 billion colours and 24 inches.

MOUSE



Microsoft Sidewinder X8 Wireless

PRICE \$105

Cable-less, comfortable, lag-free and fraggable!

Ref ID: 148422

Logitech Z-5500D

PRICE \$400

Earth-shakingly good.

Ref ID: 22626



Creative X-Fi Titanium HD

PRICE \$270

Seriously serious sound.

Issue 115, Page 47



POWER SUPPLY

XFX 850W

PRICE \$215

Plenty of power, ultra-stable rails and a great price.

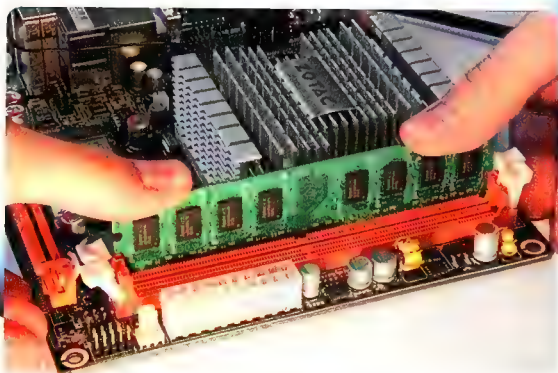
Issue 107, Page 50



The **LAN Rig**, the ultimate in portable gaming power – go anywhere, frag anyone. No longer will you be tied to a desk or forced to awkwardly manhandle your full-sized rig, helped by a convenient handle and beefy tech. Perfect for wowing people at LANs, the tech inside is fast enough to run any game, and boasts enough speed to keep your game running at full clip even if other programs intrude in the background. After all, no-one wants to miss a headshot.

There are many benefits to running an ITX system, aside from the challenge of choosing compatible components, but here are just a few of the plusses:

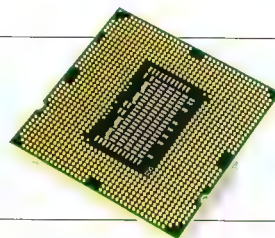
- Small footprint, so it'll fit damn near anywhere – even under a monitor.
- Lower power consumption due to restrained component choice.
- Generally low-noise due to the 'wind tunnel' design of most cases.
- Easily moveable around the house, or even taken to a mate's place – all you need is power and a screen.



Finally, for the more entertainment-minded – and really, that's all of us – there's **The Mini**, ready to play movies and music quietly and efficiently. The basic guts are fast enough for general tasks, and the IGP can handle High-Definition content. You can also choose from three entirely optional upgrades to suit your needs best: a graphics card for WoW, TV tuner to catch the game, or a Wireless card to sync without cables. The perfect energy-conscious build.

THE LAN RIG

CPU



Intel Core i5 760

PRICE \$245

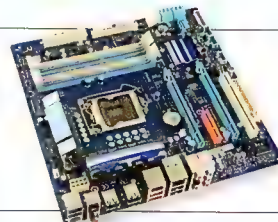
Intel's budget quad is more than you'll need in a chip!
Issue 106, Page 36

MOTHERBOARD

GIGABYTE P55M-UD4

PRICE \$200

Great overclockability, nice value.
Issue 107, Page 40



MEMORY



G.Skill Ripjaws 2000MHz

PRICE \$190

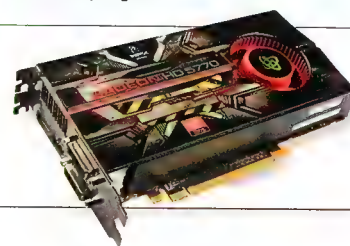
Great value memory with amazing overclocking.
Issue 106, Page 52

VIDEOCARD

ATI 5770

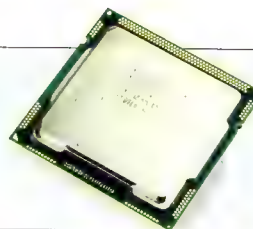
PRICE \$190

A decent value way to get into DX11.
Ref ID: 169775



THE MINI

CPU



Intel Core i3 530

PRICE \$140

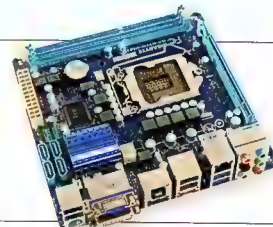
Speedy dual-core with an IGP for HD video duties.

MOTHERBOARD

GIGABYTE H55N-USB3

PRICE \$145

Tiny ITX form factor with up to 4 storage devices. Neat.
Issue 113, Page 39



MEMORY



G.Skill Ripjaws F3-10666CL7D-4GBRH

PRICE \$130

4GB of fast memory is plenty for running multiple HTPC media streaming apps.

VIDEOCARD

ATI 5570 Low Profile

PRICE \$100

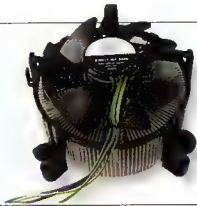
Graphical grunt in half the space. Enough for basic games, given the size.



For more builds check out the Kitlog E-mag at atomicmpc.com.au/kitlog

SUBTOTAL: \$1655

COOLER



Intel Stock Cooler

PRICE FREE

Does the job, fits under PSU well.

CASE



Silverstone SG04

PRICE \$160

Small case with handle; add two 120mm fans for awesome cooling.
Ref ID: 148266

SYSTEM DRIVE

1TB HDD

PRICE \$90

A thousand gigabyte storage drive on the cheap.



KEYBOARD

Razer Arctosa

PRICE \$50

A cool-looking keyboard that'll serve you very well.
Ref ID: 149483



DISPLAY



Viewsonic VX2233WM

PRICE \$215

21.5 inches of value-packed screen, great buy.
Issue 108, Page 42

MOUSE



Verbatim Rapier V1

PRICE \$65

Great gaming performance and nifty features.
Issue 96, Page 43

AUDIO

Plantronics Gamecom 777

PRICE \$80

Solid set of cans with great audio.
Issue 101, Page 41



Onboard Realtek ALC889A

A decent chip that does the job.

POWER SUPPLY

Corsair HX-520

PRICE \$140

Modular, efficient and keeps size manageable in cramped case.



SUBTOTAL: \$1033

COOLER

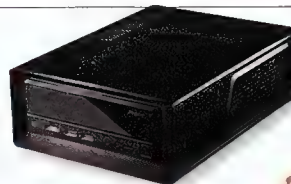


Scythe Big Shuriken

PRICE \$55

Tiny 58mm height, quieter than a sponge.

CASE



Antec ISK 300-150

PRICE \$110

Included 150W PSU, good build quality, and decent airflow.

SYSTEM DRIVE

WD Scorpio Blue 640GB

PRICE \$120

Fast 2.5" internal storage – grab two for more space!

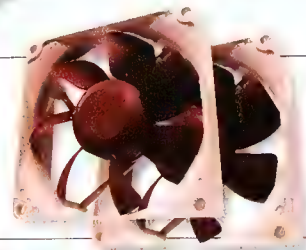


COOLING

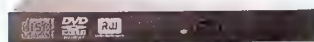
Noctua NF-R8

PRICE \$22 x 2

Get some quiet, positive flow in this mini build.



OPTICAL



Lite-On DS-8A4S

PRICE \$70

Slim internal DVD drive for movies, installs or backups.

KEYBOARD



Logitech diNovo Edge

PRICE \$199

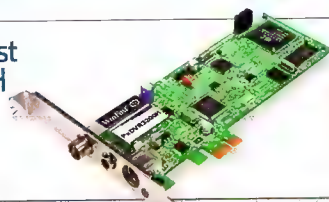
Wireless board with a trackpad for mousing.

TV TUNER

Leadtek Winfast PxDVR3200 H

PRICE \$100

Get TV in your PC. H.264 recording ftw!

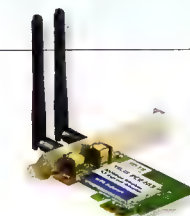


WIRELESS

ASUS PCE-N13

PRICE \$45

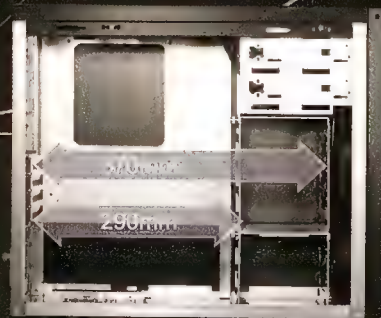
Zippy 802.11N for wireless HD video streaming.





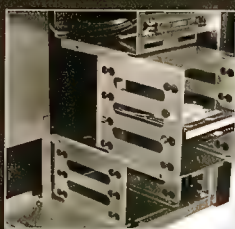
CHIC SERIES

Simply elegant



Removable HDD cage, to exchange for room to fit full size graphics card.

PC-A04



- 5.25" x 2, 3.5" internal x 7, 2.5" internal x 3 (use 3.5" x 2)
- M-ATX / Mini-ITX
- 4 Slots
- 120mm x 3
- USB 3.0 x 1 / USB2.0 x 1 / e-SATA x 1 / HD Audio
- 188 x 386 x 460mm (W, H, D)
- silver / black



PC-Q08R

- 5.25" x 1, 3.5" internal x 6, 2.5" internal x 1
- Mini ITX
- 2 Slots
- 1 x 120mm; 1 x 140mm.
- USB 3.0 x 2, HD Audio
- 227 x 282 x 345 mm (W, H, D)
- silver / black / red



PC-Q11B

- 5.25" x 1, 3.5" internal x 2, 2.5" internal x 2
- Mini DTX / Mini ITX
- 2 Slots
- 1 x 140mm
- USB 3.0 x 2, HD Audio
- 200 x 325 x 260 mm (W, H, D)
- silver / black / red



PC-V354A

- 5.25" x 1, 3.5" internal x 7, 2.5" internal x 4
- M-ATX / Mini DTX / Mini ITX
- 5 Slots
- 140mm x 1, 120mm x 2
- USB 3.0 x 2 / HD Audio / Support MS/SD(SDHC)
- 251 x 317 x 420mm (W, H, D)
- silver / black / red



PC-V352R

- 5.25" x 2, 3.5" x 1 (use one 5.25" to 3.5" converter)
- 3.5" internal x 3
- Micro ATX, Mini ITX
- 4 Slots
- 120mm x 2, 80mm x 1
- USB 3.0 x 2 / E-SATA x 1 / HD Audio / Support MS/SD(SDHC)
- 282 x 277 x 400mm (W, H, D)
- silver / black / red

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The newt hits! You die...

Dan Rutter on roguelikes, NetHack and the near impossible art of Zen.

If you call yourself a gamer, but you've never played NetHack, I really must insist that you do.

If you never have, I understand. Everything about NetHack – pretty much everything about this whole category of 'roguelike' games, actually – could have been carefully engineered to repel new players.

Eighty-column, coloured-text 'graphics'. No sound. Turn-based. Keyboard control only. And, famously, a degree of difficulty unmatched by any modern game that more than a tenth of the people in the comic-book shop have played.

In roguelikes, 'hardcore mode' is the default. A proper hardcore mode, not something like the Mildly Irksome Mode in Fallout: New Vegas.

grab the Amulet of Yendor against the wishes of the *extremely* annoying Wizard of the same name, go to the Astral Plane, and join the endless feast in Valhalla.

If you learn NetHack naturally, without constantly alt-tabbing to the Wiki, you can expect to put in hundreds of hours of play before you ascend for the first time. Plain old luck won't cut it. Even if the Random Number God loves you, you're still not even going to make it to the vibrating square, or know what the heck the vibrating square is, until you learn, at some length, how to play.

When you've got the basic idea, go to **alt.org/nethack**. It's a Web site for people who

when we discover that there are further, 'unofficial' conducts, untracked by the game and only provable by cheat-proof recorded games.

Some unofficial conducts are silly. Some are hard. And then, there's 'Zen'.

All you have to do for the Zen conduct is play the whole game, except for one unavoidable late-game book-reading, while wearing a blindfold.

Completing NetHack while blindfolded is not as hard as, say, winning the Bathurst 1000 in the same condition. It won't impress the kids on Xbox Live, either. And it's not much actual fun.

But boy, does it ever put those annoying GTA helicopter missions in perspective. ☹️

Even if you play the same character race and class every time, you'll be learning.

Saving the game, for instance, is just a kind of pause button. When you load the save, the game deletes it. When you die, you die. Unless you back up your savefiles (not good form at all, old chap), or play in 'Wizard' mode, where you can resurrect from most deaths.

You won't learn properly using Wizard mode, though. There's enough variation in NetHack's swirling cloud of interacting elements (as I write this, **nethackwiki.com** has 2,111 articles...) that you won't find yourself going through the same tedious early-game stage over and over just because you keep getting murdered before you see Level 3. Even if you play the same character race and class every time, you'll be learning. And, with any luck, having fun.

I don't insist that you actually become *good* at NetHack. But you should at least play long enough to learn what being good at NetHack looks like. Because then a greater enlightenment awaits you.

The goal of NetHack is to 'ascend'. Get through the branching trick levels at the end,

play NetHack the old-fashioned way, via Telnet. You can play on the **nethack.alt.org** server, watch recordings of past games, or even watch games live.

Alt.org also has statistics. Some of which are astonishing.

The obvious NetHack leaderboard categories include the simple score you get at the end of the game, or ascending in the minimum possible number of turns, or even your start-to-ascension ratio.

But then, there are Conducts.

NetHack tracks what you do in a game. And what you *don't* do.

If you never pray, for instance, you get the Atheist conduct. If you never wish for anything, you get Wishless. If you want just a little more challenge in your game, you can never eat anything (yes, you do normally have to eat to survive), or even *never hit anything with a weapon*.

Ordinary NetHack players receive our moment of humbling enlightenment

Ain't no school like old school.

dan@atomicmpc.com.au



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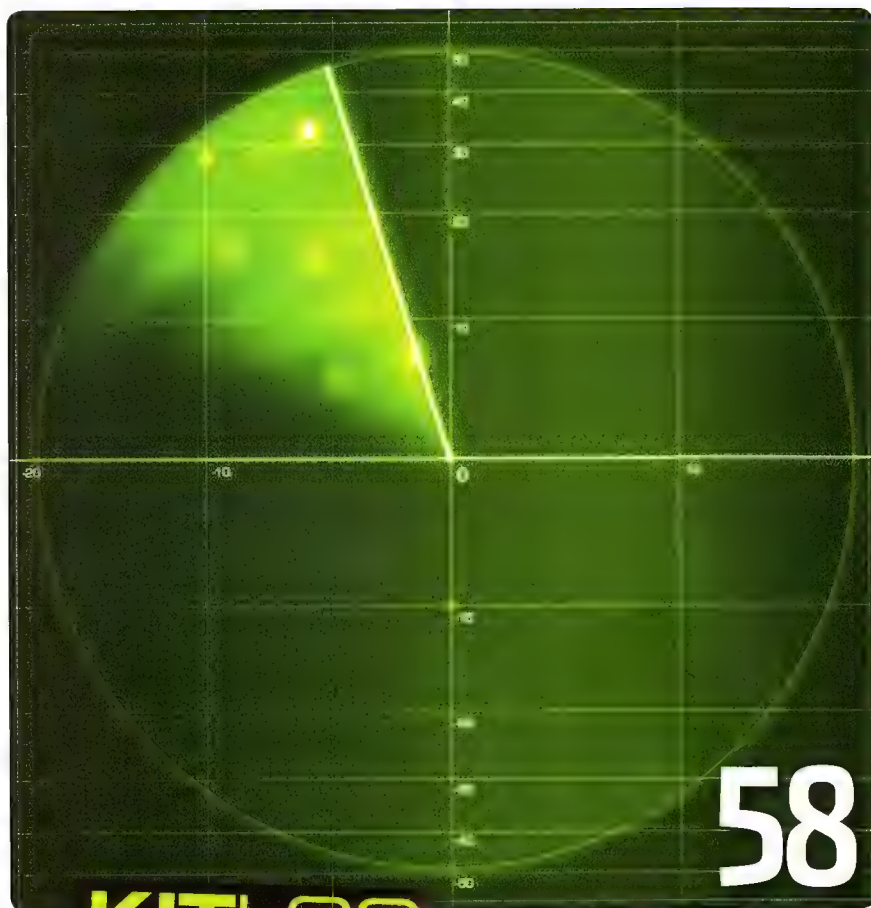
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TUTORIAL

HANDS-ON TUTORIALS FOR THE TECHNICALLY MINDED



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WEEKLY NEWSLETTER

Keep up with the latest from Atomic!

Atomic isn't restricted to the pages of this magazine, and there's still plenty more to be had online.

KITLOG
atomic

The essential guide
to building and
cooling your next
computer.



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Are you keen to always know the best hardware for any PC build or rig? Then you need to check out our new KitLog eBook, a quarterly online publication dedicated to showing you the best gear for more than a half-dozen PC projects.

Only available at
www.atomicmpc.com.au/kitlog

Careers in Defence



Chris Taylor looks at jobs in the Department of Defence.

If you browse a lot of Australian-based tech and games websites, including Atomic's own website, you've probably noticed the prevalence of advertisements promoting careers in the Australian Security Intelligence Organisation (ASIO), Australian Defence Force (ADF) and Defence Signals Directorate (DSD). A significant portion of the demographic that accesses these websites is exactly what – in terms of age, interest and skills – the Department of Defence and ASIO are looking for.

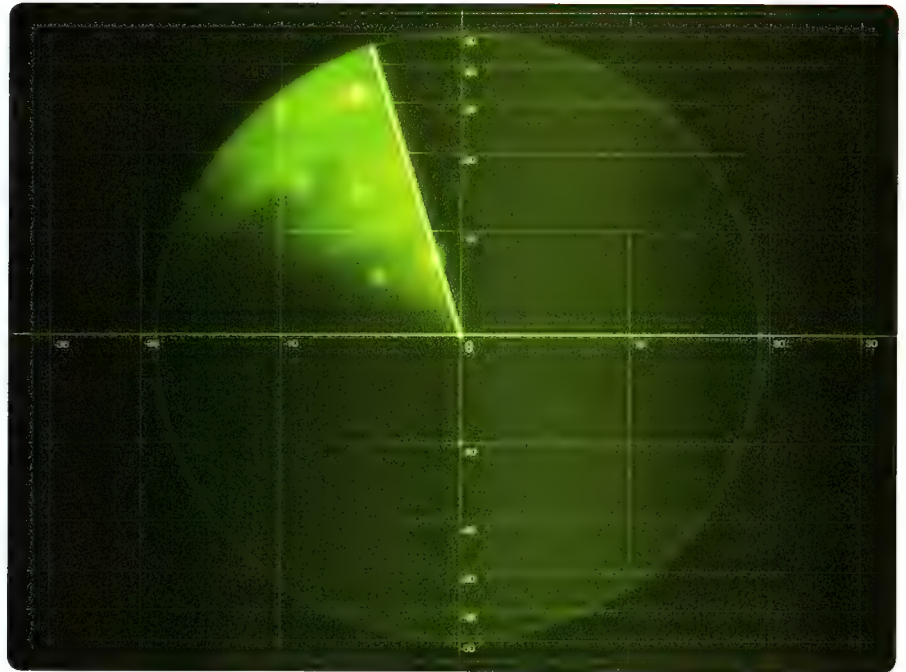
They're always recruiting, too. The Department of Defence, which is responsible for the ADF and DSD, and ASIO are on the lookout for applicants from a range of backgrounds. There are graduate jobs and positions aimed at those with experience elsewhere, either in the public sector or the private sector. There is part-time work, particularly in the ADF with its Reserve branch. There's also opportunity to further your training. The Department of Defence and ASIO are open about wanting to improve the skills of their employees. Some of the training is bound to be highly specific to the work, of course, but the more general qualifications can be carried over to jobs elsewhere if and when you decide to move into the private sector.

Defence in Australia

Defence jobs are not limited only to the army, navy or air force. It all depends on what you're interested in or qualified to do, of course, but there are numerous government departments and agencies who recruit those interested in using computers to hold off the hordes of pillagers and evildoers and miscreants and such.

The Australian Defence Force

The Australian Defence Force (www.defencejobs.gov.au) encompasses the air force, army and navy. Each branch recruits for positions of interest to those with a background in technology, particularly technology relating to communications and mapping. They also recruit for a wider assortment of positions than we can list here, ranging from cooks to pilots to soldiers. University graduates may have an advantage in getting certain jobs and may find some parts of their training shortened, but you can join the Defence Force fresh out of secondary school and receive all necessary training through the ADF. There are, however, dedicated graduate positions. Accelerated office training is available to applicants who've come from select backgrounds including medicine and engineering.



In addition to the on-the-job training, the Defence Force both has its own university, the Australian Defence Force Academy in Canberra (which is tied into University of New South Wales), and a sponsorship program that essentially pays you to study. There are all manner of restrictions and hoops to jump through, of course. They'll only pay you to study engineering and medicine. Even then, they expect you to pay for the first year of your studies by yourself – obviously they're only going to bother with people committed to whatever they're studying. You also put yourself into a situation where you have a host of commitments to the ADF, both while and after you complete your studies. It's not possible to scam a (mostly) free degree out of them and then run off to join the private sector. In the case of the ADF's own Academy, graduating from the degree means not only satisfying the academic requirements of your course, but fulfilling various military requirements. If it turns out you're a capable student but a crappy soldier, you won't graduate.

If you're still a student, either at school or in a tertiary institution, or working somewhere else and wanting to see if the Defence Force is for you, the ADF runs three programs that may be of interest. Secondary-school-aged readers can look into the cadets program, which is run through some schools. Those in their final year of secondary schooling should look into the recently introduced 'gap year' program.

And, of course, there are the reserves (www.defencereserves.com).

Whether you join the defence force intending to be a rifleman or a communications operator, you'll have to complete the basic training course. The Defence Force expects you to have a 'reasonable level of fitness'. If this is a problem for you and you're thinking of joining the Defence Force when you, say, finish school at the end of 2011, you better start working on it now. You won't be the only applicant with concerns about this issue – the ADF has put together a website that details the fitness requirements and outlines an achievable fitness plan (www.defencejobs.gov.au/lifestyleoffitness).

Australian Security Intelligence Organisation

ASIO (www.asio.gov.au/Careers/ASIO-Careers/Information-Technology.html) became a household name in the early 2000s. It's an intelligence organisation – our equivalent, we suppose, of the CIA. It's interested in terrorism, espionage and sabotage. ASIO specifically hires IT specialists, as well as specialists from other fields including linguistics and engineering.

ASIO is a highly secretive organisation. They discourage you from even telling people you've

applied to work for them. As such, we don't have much information to share with you, other than that if you succeed in your application you'll need a Top Secret clearance, and to move to Canberra, one of the few planned cities in the world, as ASIO's website enticingly puts it – and keep your bloody trap shut.

Defence Signals Directorate

The DSD (www.dsd.gov.au/careers/index.htm) is an agency you're less likely to be familiar with than ASIO. They're tied into the ADF and promote themselves as working in the 'slim space between the difficult and impossible'. Enough with the babble that makes them sound bad arse. The DSD is an intelligence organisation that intercepts and analyses information and provides information security to Australian government agencies. The roles they recruit for sound much like what ASIO looks for – linguists, IT specialists, etc. but they're a bit more open than ASIO in what they're actually looking for. In terms of IT security roles, they're after people who are qualified and experienced in software and hardware engineering, networks, computer science, maths and intelligence analysis.

The DSD is currently promoting the 'Altitude' graduate program, which aims to give

graduates a well-rounded introduction to the agency and what it does – if you're successful in your application to be part of the program (applications for the 2012 intake close mid-April this year, which is days after this magazine appears in newsagencies) you'll receive experience and training in various areas of the DSD, not just IT.

As with ASIO, DSD expects you to have a security clearance and relocate to one of the few planned cities in the world. And, of course, you'll need to present yourself as someone who won't hit the pub or the Atomic forums and blab about the agency's secrets.

Elsewhere in the Department of Defence

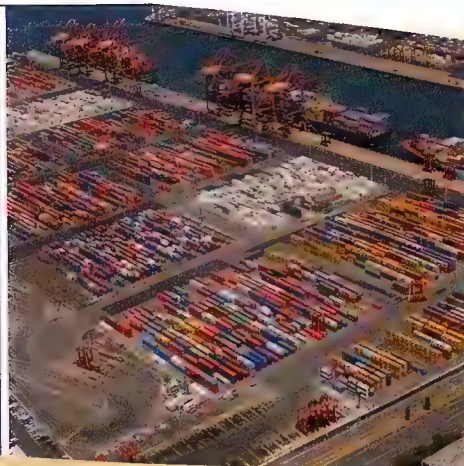
Careers are to be made elsewhere in the Department of Defence, including the Defence Science and Technology Organisation, which is basically a research agency; the Defence Intelligence Organisation, which analyses intelligence; the Defence Imagery and Geospatial Organisation, which gathers 'geospatial intelligence' and gives it to the people who do whatever needs to be done about the stuff that DIGO finds; and the Chief Information Officer Group. Information about the different branches

of the Department of Defence and the career opportunities therein can be found through the Department's careers page (www.defence.gov.au/header/careers.htm).

Who are these jobs for?

Perhaps it's obvious, but we feel it's worth saying: defence jobs aren't for everyone. In the case of the ADF, you might look at the minimum fitness standards and other entry requirements and think they're perfectly reasonable. That doesn't mean you have the capacity to succeed in the Defence Force or that the Defence Force will feel that you have what it takes. We've no personal experience soldiering, but we'd imagine it to be a hard job. The recruitment material is obviously designed to entice but it doesn't lie about the challenges an ADF career offers. These challenges may or may not appeal to you.

ASIO and the Department of Defence pay well but have high standards. Depending on which part of the Department of Defence you want to work for, you'll likely have to relocate to Canberra. ASIO and the Department of Defence are very, very, very serious when they insist on secrecy and security. If you're considering applying for a job at one of the intelligence agencies, think long and hard about your character – if you find it hard to not brag about all the cool stuff you've seen and done, a career in intelligence gathering and analysis really isn't for you. ☹



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Overclockers Codex:

Sandy Bridge (P67)

Hardware maestro **Vito Cassisi** dishes out the clocks on Intel's better-late-than-never new chipset.

Once again we've been subject to the continuous cycle of Intel's Tick-Tock strategy. A 'Tick' represents a change in process technology (typically a drop in process size and increase in transistor density) whilst a 'Tock' marks the introduction of a new microarchitecture. Sandy Bridge is the codename for Intel's second generation Core i processors – representing a Tock – and introduces a few critical changes to how overclocking is performed.

Similar to Nehalem, Sandy Bridge has its memory controller on-die. Changes include the movement of the clock generator and PCIe controller from the motherboard to the CPU die, and integrated Intel HD Graphics (typically 2000/3000, depending on the model). These changes may sound trivial, but they have a large impact on the overclocking process, particularly the movement of the clock generator.

Note: This guide compliments the X58 overclocking guide we published previously, which you can find in issue 2 of our free KitLog magazine at <http://goo.gl/ZuBY3>. Also note that Atomic is not responsible for any damage incurred by following this guide.

What's the deal with the clocks?

What concerns us with Intel's latest consumer kit is the placement of the clock generator.

Unlike previous microarchitectures, Sandy Bridge's 'base clock' (BCLK) is linked proportionally to the PCIe clock at a 1:1 ratio. That is, if you increase the default BCLK of 100MHz to 105MHz, the PCIe clock rate will also raise to 105MHz. Veteran overclockers out there will know that this is far from optimal; changing the clock speed of the PCIe bus is a recipe for instability. These clocks cannot be isolated, rendering the BCLK virtually unadjustable.

Even with such limitations nipping at our freedom, all is not lost. Multipliers are still in play for both memory and CPU. The latter requires that you shell out for the special 'K' models (similar to AMD's 'Black Edition' range). These CPUs come at a price premium with added cache, a beefier integrated GPU (for those who actually care), and most importantly an unlocked CPU multiplier.

I have a motherboard with a H67 chipset, can I overclock?

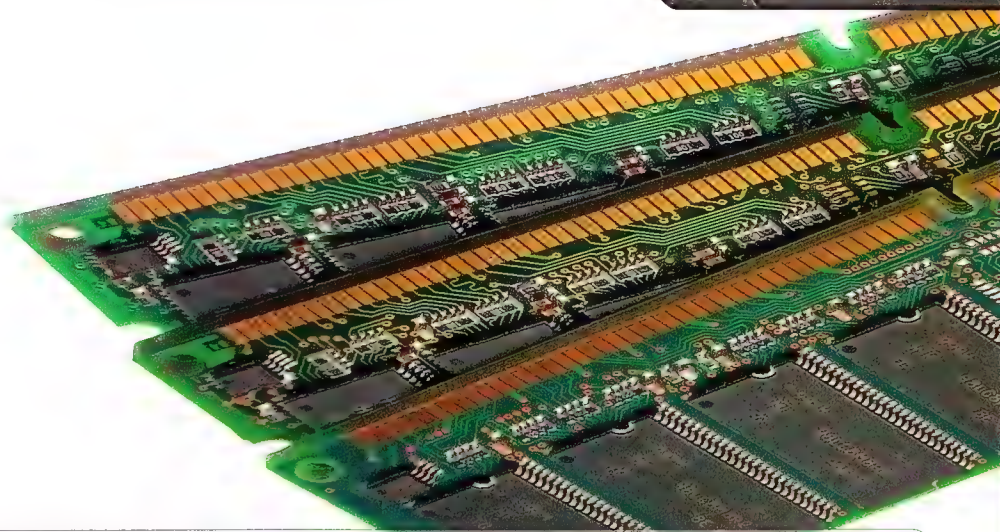
Yes, you can still overclock your memory. Overclocking the CPU will be limited to whatever small adjustments you can get away with on the BCLK. In other words, you cannot overclock using CPU multipliers, even if you have a K



edition CPU. On the flip side, you cannot take advantage of the superior internal GPUs on the K edition CPUs unless you have a H67 chipset. Crazy, right?

i5-2500K vs i7-2600K

There are two major players in the Sandy Bridge line-up – the 2500K and 2600K. The main difference between the two is the shared L3 cache, of which the 2600K has an extra 2MB over the 2500K for a total of 8MB. The 2500K also lacks Hyper-Threading, although this is often turned off to keep temperatures down while overclocking. We recommend the 2500K



I forgot what all the CeePeeYou jargon means!

Let's recap.

Base clock (BCLK)

Components use a base clock to determine their clock rate. A multiplier may be used to increase or decrease the clock rate of a specific component. Changing the BCLK will affect many components, including PCIe (PEG), memory and CPU clock rates.

Multiplier

A numerical value used to raise or lower the clock rate of a particular component. The multiplier determines the clock rate by multiplying the BCLK by its value. e.g. a CPU with a 40x multiplier on every core, and BCLK of 100MHz will give you $100 \times 40 = 4000\text{MHz} = 4\text{GHz}$.

Memory Latency / Timings

CAS: Column Access Strobe
tRCD: Row to CAS Delay
tRP: RAS Precharge
tRAS: Row Access Strobe
T: Command Rate

Lower values result in increased performance. Latencies are often displayed as a string in the form CLX-X-X-X XT, where the 'X' characters represent the numerical values of the above latencies respectively. Typically you'll find this string on a sticker placed on the individual memory modules or their packaging. You don't really have to remember what these individual latencies are called, you can just fiddle with them until you find a stable setting. On the other hand, knowing the acronyms can help when researching appropriate values.

CPU voltage/vCore

Voltage of the CPU cores. Our maximum recommended voltage for 24/7 use is 1.45v, and 1.55v for short benchmarking sessions.

VDDQ/DRAM/vDIMM

Voltage of the memory modules. Set this to whatever your memory kit requires. You may recall that X58 systems require the QPI/VTT to be set within 0.5v of this voltage. e.g. 1.65v for vDIMM would require at least 1.15v QPI/VTT to prevent damage. Sandy Bridge systems do not have this limitation, and QPI/VTT has been replaced with VCCIO (although GIGABYTE has stuck with the old terminology, despite the absence of QPI technology in the platform).

CPU PLL (Phase-locked Loop)

This voltage assists the processor with remaining in synchronisation with the BCLK. Increasing this voltage may be necessary at very high clock rates.

Load-line Calibration

vDrop and vDroop are phenomena which affect the magnitude of the voltage supplied to various components. vDrop describes the discrepancy between a voltage setting in the BIOS/EFI setup, and the actual voltage being supplied to a component (typically the CPU cores). vDroop is the drop between the voltage supplied when idle, and the voltage supplied when under load (due to stress testing software or otherwise). vDroop can cause instability issues, particularly at higher clock rates. LLC aims to reduce vDroop by actively manipulating the voltage to keep it constant. There are various debates regarding the affects of LLC on lifespan, but the general consensus is that it's safe if used sparingly.

PCH (Platform Controller Hub)

Replacement for the traditional Northbridge and Southbridge.

Intel Turbo Boost

Increases the multiplier of individual cores temperately to provide a short term power boost. Sandy Bridge motherboards with K processors allow you to manually set this multiplier for individual cores.

New jargon

A new platform isn't complete without subtle changes. Keep a look out for the following.

VCCIO

Memory/PCIe controller voltage, similar to the former QPI/VTT. Don't exceed 1.2v; it isn't necessary and contributes to heat.

VCCSA

System Agent voltage, previously known as 'uncore' voltage. DO NOT change this voltage. It's known to cause rapid degradation of CPU lifespan and provide no overclocking benefits. Leave it – do not be tempted to try it, don't get it confused with VCCIO, and don't say we didn't warn you!

Turbo Boost Ratio

The Turbo Boost multiplier setting for all or individual CPU cores.

CPU PLL Overvoltage

Allows the motherboard to overvolt the PLL. This is essential when overclocking beyond 5GHz.

Turbo Power/Current Limit

Sets a wattage/current limit for Turbo Mode. Once the limit is hit, the multiplier is dropped to reduce power demand. Set this as high as you want to.



We recommend the 2500K purely because of the lower price.

A decent motherboard and PSU, and a bit of luck, is all that is required to push a Sandy Bridge CPU above 5GHz.

purely because of the lower price. A decent motherboard and PSU to provide clean power, and a bit of luck, is all that is required to push a Sandy Bridge CPU above 5GHz.

I saw these pretty sticks of RAM at my local store, I need them right?

Nope! High performance memory is not required, nor officially supported (the highest memory multiplier we've seen is 22x for a 2200MHz clock rate). So those xtreme-super-hyper-mega-awesome-sauce sticks will do little more than lighten your wallet. You're also limited by the BCLK, so tight latencies are often easier to achieve than a higher clock rate. Regardless, the performance gains from high performance memory are trivial for majority of applications.

Know your limits

Before jumping in head first, be sure to research your components to get an idea of their known limits. Keep a look out for clock rate, voltage and temperature limits. Forums such as Atomic are great for this purpose, and the friendly users are more than willing to assist.

It's getting hot in here

Please, keep your clothes on. What you really need is a decent cooler. If you've got a 2600K, Intel provides a mediocre stock heatsink and fan which should manage 4GHz without a problem – any higher and things start to get toasty under load. The 2500K cooler is outright rubbish, and should be placed in the nearest trash disposal unit (we only ask that you do this while scoffing audibly).

Alternatives to stock cooling are abundant. Socket 1155 shares the mounting specifications as socket 1156, thus the multitude of existing

coolers can be used. Some great air coolers include the Noctua NH-U12P SE2, Thermalright Venomous X, and the massive Noctua NH-D14. These should manage 5GHz if the ambient temperature is cool and you've got a case with good airflow.

Tools of the trade

It helps to have software aid when overclocking to monitor and test your configuration. Some important software to get hold of includes:

Stress testing

- OCCT
- Prime95

Monitoring

- CPU-z
- Real Temp / Core Temp

It's also interesting to compare performance before and after doing some tweaking. Benchmark software such as AIDA64, wPrime, PiFast, SuperPI Mod, and Cinebench are all good candidates. As usual, a quick Google search can find you the best sources for these applications.

Playing with the BIOS/EFI

At some stage you'll end up in an endless reboot loop because of shonky memory settings or otherwise. The best way to resolve this is to reset the CMOS, which, depending on your motherboard, may be a button/jumper on the board or the I/O panel. If you forget to save your settings in a profile slot (if your motherboard supports this), you may find that recovery options such as Xpress Recovery on GIGABYTE boards will be of assistance.

Updating the BIOS/EFI is also a good idea before you start overclocking. Later revisions provide CPU PLL overvoltage support, which is essential for large clock rates.

When changing values, it may help to download a PDF copy of your motherboard manual. If you're not sure where a setting is, you can simply search the PDF, which contains screenshots and instructions. Remember that different motherboards may use different terminology for the same values.

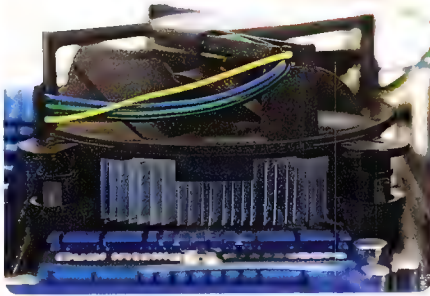
To 5GHz and beyond!

The great thing about Sandy Bridge processors is their overclocking ability. While 4GHz was every overclocker's aim in the Nehalem era, this has been significantly superseded by Sandy Bridge, which has proven to be capable of reaching 5GHz and beyond on air cooling. Similar to the i5/i7s of old, not all processors are capable of attaining such clock rates, although it is quite likely. As they say, not all silicon is made equal.

A few tips before we start

General

Update your BIOS to the latest release, then enable 'CPU PLL overvoltage', or set it to 'auto'. This will give you your best shot at 5GHz. You

RUBBISH

may also disable any power saving technologies (such as EIST and C1E) which automatically adjust voltages/clock rate. This isn't necessary, but may provide peace of mind knowing that you have full control.

You can also turn off Hyper-Threading technology to prevent excess heat during stress testing. If you rarely run programs that use upwards of four cores, turning HT off is a good idea.

Memory wise, ensure any special performance modes are disabled, such as XMP and other enhancements.

Lastly, unplug any unnecessary drives (including thumbsticks) from your system to prevent issues with the motherboard trying to boot into the wrong device.

ASUS EFI

Motherboard manufacturers tend to fail when it comes to having consistent setup tools when compared to their competitors. With the introduction of EFI, we can only imagine how confusing the setup process will get, with every vendor fighting to have the most glossy gimmicks to distance users from the horrors of accessing voltages and clock rates.



The massive Noctua NH-D14.

NOT RUBBISH

And this brings us to our main tip – on ASUS boards, you may come across the Ez-Mode GUI when you first enter setup. Be sure to ignore

this pretty display and enter 'Advanced Mode' by clicking the appropriate button. Click the 'Extreme Tweaker' tab to display the important settings. At this point, you may wish to enable 'Load Extreme OC Profile' to prep your system for a bit of fun.

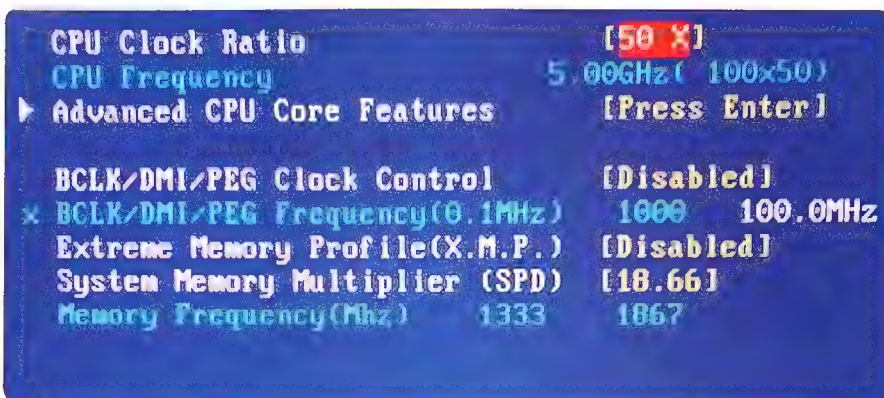
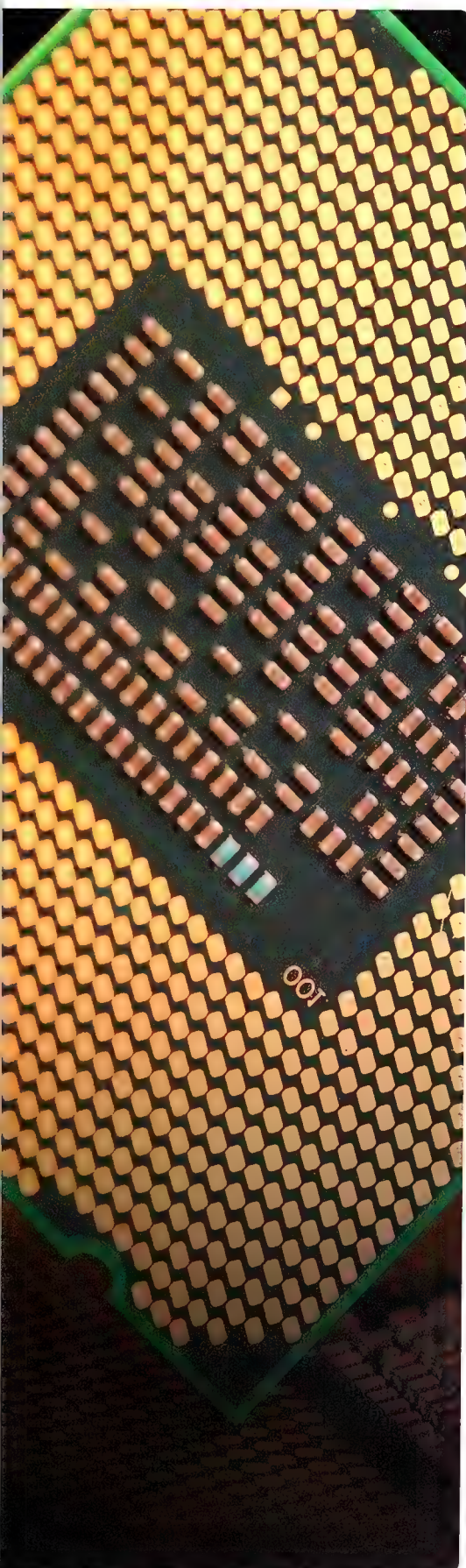
Some motherboards may not give you the option of changing the CPU multiplier directly. Instead, you must utilise Turbo Mode settings for individual cores. On an ASUS board, change the 'Turbo Ratio' setting to 'All Cores mode'. Now you can adjust the individual multipliers of each core. Change all of these to the overall CPU multiplier value you wish to use.

GIGABYTE BIOS

The good ol' fashioned BIOS has a good ol' fashioned principle – KISS (keep it simple, stupid). All the work of changing Turbo Mode settings isn't necessary because GIGABYTE still uses a single setting to adjust all four core multipliers at once. It's probably just setting Turbo Mode behind the scenes, making the process faster for the end user.

The main thing to note when using a GIGABYTE board is to store your overclock settings using any inbuilt profile system provided. Not all models support this, however. This saves you time if you're forced to clear the CMOS after a bad overclock.

CPU Clock Ratio	[34 X]
CPU Frequency	3.40GHz (100x34)
Real-Time Ratio Changes In OS	[Disabled]
Intel(R) Turbo Boost Tech.	[Auto]
-Turbo Ratio(1-Core)	38 [Auto]
-Turbo Ratio(2-Core)	37 [Auto]
-Turbo Ratio(3-Core)	36 [Auto]
-Turbo Ratio(4-Core)	35 [Auto]
-Turbo Power Limit(Watts)	95 [Auto]
-Core Current Limit(Amps)	97 [Auto]
CPU Cores Enabled	[All]
CPU Multi-Threading	[Enabled]
CPU Enhanced Halt (C1E)	[Auto]
C3/C6 State Support	[Auto]
CPU Thermal Monitor	[Auto]
CPU EIST Function	[Auto]
Bi-Directional PROCHOT	[Auto]



Baby steps

Everyone has their own preferred process they follow when overclocking. We'll outline one of our preferred methods – the 'binary search method'. This involves taking a multiplier halfway between stock and our target (in this case, 50) and testing for stability. For a 2600K, this would be 42 (stock setting is 34). If this is stable, we take the multiplier between this known stable setting and our target i.e. 46. On the other hand, if this is unstable, we take the multiplier between the last known stable setting and the last unstable setting i.e. 38. Savvy readers may notice that this is an application of the binary

3. Raise the CPU multiplier to 42x and increase the CPU voltage to 1.35v. This is probably overkill for now, but removes voltage as a variable until we push closer to 5GHz. Note that voltage affects heat output, so if you don't want an extreme overclock, turn down the voltage until you find a stable minimum.
4. Boot into Windows and run Prime95 (Blend Test) for 20 minutes, while keeping an eye on the core temperatures using Real Temp. Don't allow the CPU temperature to exceed 80c. If Prime95 runs successfully, restart the PC and increase the CPU multiplier to 46x (halfway between 42 and 50, as per the binary

The first thing to do is load optimised defaults. This sets some of the more obscure options to appropriate values, such as clock drive voltage.

search algorithm used in computer science, which shortens otherwise linear search time to the faster logarithmic time complexity. It's not the most efficient way to overclock; experienced overclockers will be able to jump to settings and tweak, but it is simple and systematic.

1. Initially, you'll have to access your motherboard's setup tool (be it BIOS or EFI based) by hitting the Delete key during POST (Power On Self Test). From here it gets a little tricky, simply because terminology differs between manufacturers. The first thing to do is load optimised defaults. This sets some of the more obscure options to appropriate values, such as clock drive voltage. You should remember to do this every time you reset the CMOS, or update the BIOS/EFI.
2. Adjust the memory multiplier, latencies and voltage to match the specifications of the modules. You may find that getting the exact clock rate will not be possible, in which case you should choose a multiplier that gives you the closest result below the rated frequency. If the memory is clocked very high, you may need to bump up the VCCIO/Vtt voltage slightly.

search method). If unsuccessful, try enabling the lowest level of LLC, then try again. If your attempt is still unsuccessful, you can try raising the voltage to 1.4v and retest. Further attempts might include a higher level of LLC (avoid using the highest setting) or a higher voltage. A typical 2500K/2600K should be fine at 4.2GHz without all this trouble, but your individual results may vary. If you're still out of luck, repeat the binary search method until you find a stable multiplier.

5. Repeat step 4, each time following the binary search method outlined earlier. Increase the CPU voltage before deciding whether a setting is unstable, while keeping an eye on temperature. If significant voltage increases have no effect, or the temperature is becoming a problem, revert to your last stable clock and skip to step 6. Do keep the aforementioned safe voltage ranges in mind.
6. Eventually you'll hit 5GHz, or close to it. If you're still using the original 1.35v setting, then you've got an excellent chip in your possession! Most people will require upwards of 1.45v. If you raised voltages in large steps, try lowering them

incrementally to prevent excess heat, then retest.

7. Once you've found what you believe to be a stable maximum, run OCCT's Linpack test for an hour. Keep an eye on the temperature of the CPU! To be absolutely sure everything is going to plan, run Prime95 overnight on Small FFT mode.

BCLK tweaks

As mentioned earlier, it's possible to make minute changes to the BCLK without compromising stability. If you're game, you may find that decreasing the BCLK by increments of 0.1MHz can help improve stability. On the other hand, increasing by the same increment may yield greater CPU and memory frequencies.

Tinkering with memory

Memory isn't as important as it once was. The performance gains over a budget kit are negligible for most applications. When benchmarking, users prefer to squeeze the most of their memory to shave precious milliseconds off SuperPI and the like.

Once you've found a suitable overclock on your CPU, you may focus on the memory. With

limited granularity on the memory multiplier and leeway on the BCLK, it may be difficult if not impossible to overclock your memory. Loosening latencies may help achieve a higher stable memory clock rate. If not, tightening latencies is a good consolation. A higher clock rate will generally perform better than tighter latencies.

Tweaking memory latencies is quite straightforward. Simply lower the values outlined earlier one step at a time and test. Note that tRAS should be set to CAS + tRCD + 2 as a minimum. Unstable latency values tend to cause reboot loops, so be prepared to hit that 'clear CMOS' button.

So much blue, what does it mean?

Despite the overwhelming hate that BSOD errors cop, they do actually serve an important purpose. Error codes help to decipher exactly what went wrong while working with, or trying to boot Windows. Here are a few important codes to look out for.

0x0000007B = AHCI mode changed. If you install Windows with AHCI mode enabled, you must also boot with it enabled. Clearing CMOS


or upgrading the BIOS version may change this setting, causing this error to emerge. This is not overclock-related, but pops up regularly.

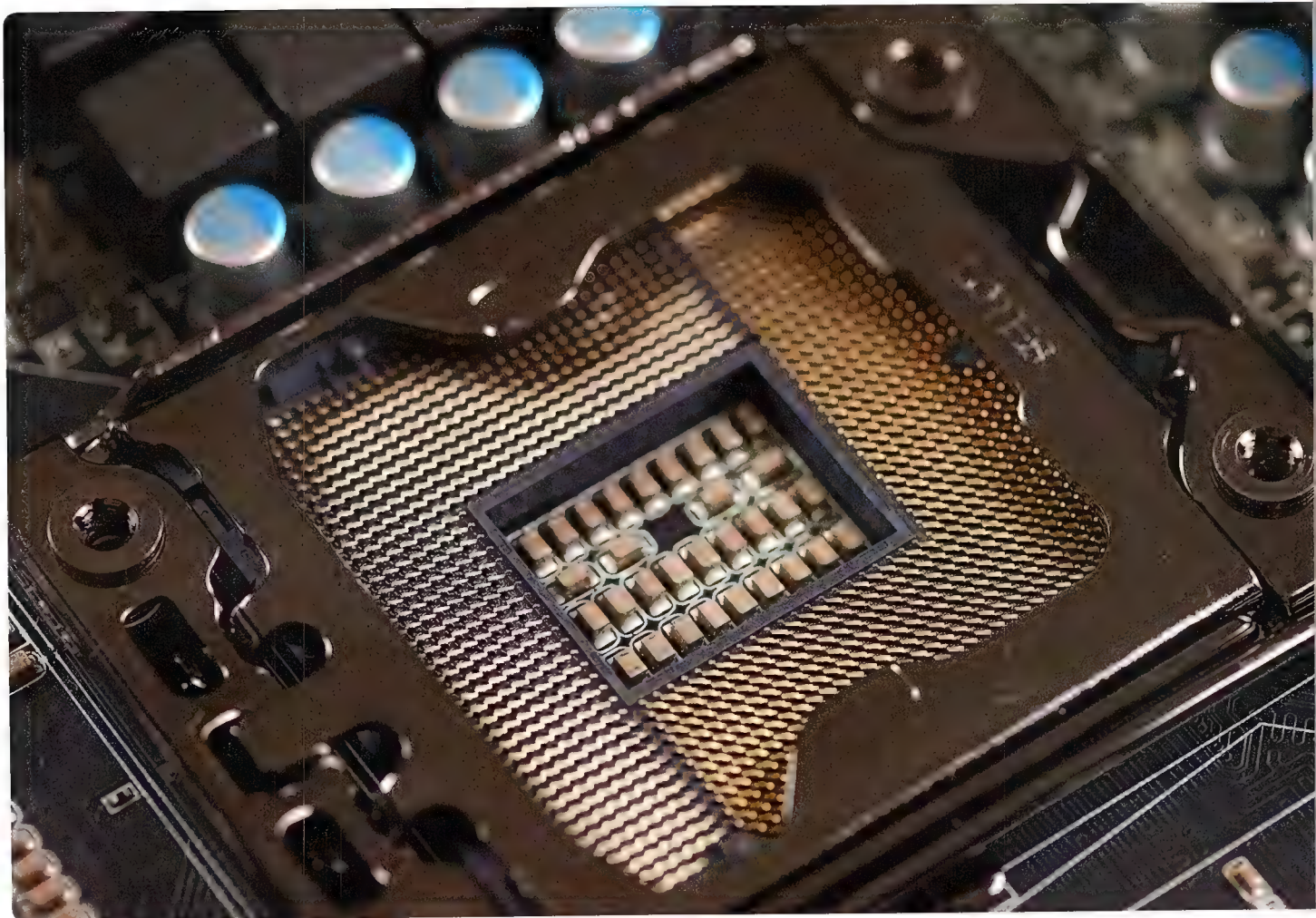
0x00000124 = vCore or VCCIO is too high/low.
0x00000101 = Generally means add more vCore.

0x00000109 = Not enough vDIMM.

There are plenty more BSOD messages that may occur. Deciphering how to fix the problem tends to be a case of adjusting the voltage(s) associated with your last change. e.g. raising the CPU multiplier may require a higher vCore to maintain stability.

What's next?

By this point you've probably found your highest clock rate for both the CPU and memory. From here you may choose to try your hand at pushing past 5GHz (or to 5GHz, if you're yet to hit it) by using a quality aftermarket cooling solution, or perhaps move onto a different component altogether such as the GPU. Before you know it, your machine will be as fast as a trolley filled with frightened fedora-wearing hipsters speeding down a steep slope – out of control and as far removed from that mainstream 3GHz garbage as possible!  VC





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- 3 Upscale and aggressive styling with dual-purpose front panel bezels for maximum cooling for silence
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Thinking Outside the Box

Take control of your digital world with confidence, using **Chris Trowbridge's** handy two-part guide.

The CIO walks down the corridor guiding his colleagues to the boardroom. As he enters, the room 'recognizes' him and the digital sign outside the door changes to display the details of his booking as being 'In Session'. A touch panel, embedded in the table, lights up to display a page of buttons. Dual projectors and screens drop silently from the ceiling and begin to warm up. Once everyone is comfortably seated, he touches a button and the right hand screen changes to display the company boardroom in London, while the left displays a PowerPoint presentation. He touches the screen to adjust the remote camera to frame those present in London and begins. The new company IT strategy can now be revealed to the whole of the Board at once.

Is this for real, or is this a scene from some futuristic sci-fi film?

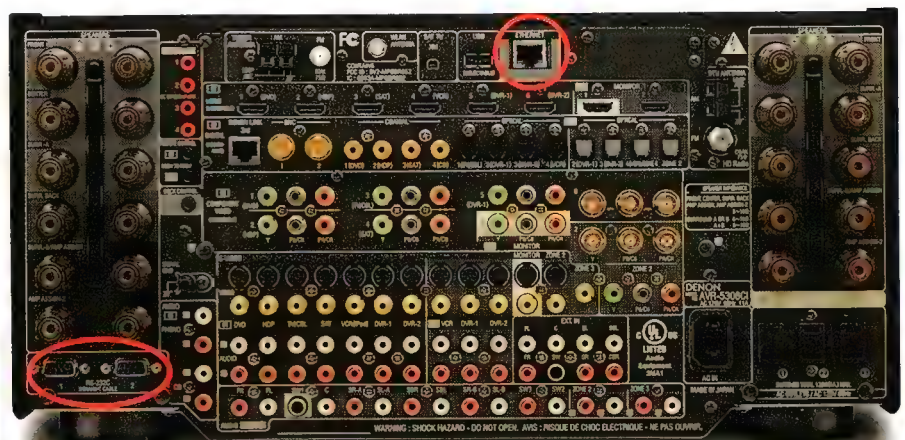
This scenario is not only entirely possible today, it actually exists in many of the world's commercial and public spaces. In fact, if this technology didn't exist many of the large venues we visit regularly would not be able to operate reliably. Imagine someone trying to 'switch on' your local football stadium switch-by-switch before the big game!

Even better, this control is now also available in your home too. Products are being developed that allow you to control devices around your home and automate your environment with minimal effort. Press a button to watch a movie and watch the lights dim, home theatre start and screen adjust itself ready to play. All you need is some automated popcorn!

What can be controlled?

Most devices are able to be controlled in one form or another. Old devices were often not designed with automated control in mind (such as an old compact cassette deck), and 'inventive' retrofits were often employed to enable these devices to be controlled. Modern devices are a different story however, and it's common to see systems that:

- 'Switch' vision. Got a dozen DVD players and only ten TVs? Switch any DVD player to any TV, or all TVs! Your home theatre receiver is essentially a basic, single output video switch, among other things.
- Process and distribute audio with Digital Signal Processors (DSPs) – another function of the humble home theatre receiver.
- Control lighting through your house or office.
- Adjust climate either manually from the couch via aircon control, or automatically via external controllable blinds and louvered windows.
- Automate your home theatre system – TVs, projectors, home hi-fi receivers, DVD/BluRay players all working in harmony!
- Automate any or all the media functions of your PC: Media Centre, VLC, WinAmp, radio/TV tuner cards.



The rear, with serial and IP ports highlighted. Ooooh, so many sockets!



AMX NI3100 controller from the front.

• Control waterfalls, spas, blinds, fireplaces, garage doors, cameras, videoconferencing units, security systems... the list goes on! Control allows people to think outside the box and influence many things you wouldn't normally consider. For example, a prestigious company wants to make a big impression on prospective clients so they link their boardroom to the company kitchen. Clients can press a button on the boardroom touchscreen to send an order to the kitchen for a coffee of their choice! Sweet!

Or a company with a light, airy foyer that still needs a quick place to meet builds a large glass walled meeting room in the middle of their foyer which doesn't spoil the look but gives them the extra room they need. The glass is sound proof but perfectly clear. Need privacy? Press a button and the glass goes opaque instantly. Even sweeter!

How are devices controlled?

How a device is controlled is often determined right from the beginning of the design stage. The level and reliability of that control is often more the issue. Control of devices can be broken into those offering unidirectional (one way) or bi-directional (two way) control. For example, you can control most domestic Audio/Video (AV) equipment via the infrared remote that comes with the device. You aim the remote in the general direction of your DVD player, press a button on the remote and the disc starts playing. If it doesn't, you correct your aim and press it again. That's basic remote control.

Electrically, this is unidirectional control: the remote sends a series of IR pulses to the DVD player and assumes the DVD will start playing.

If a machine sent the IR code it would have no way of knowing whether the DVD started or not. In this 'special' case, however, you are watching the result and if you notice it fail you try again. Hence you provide a feedback path to the system, in essence enhancing it to become a bidirectional system.

Other devices can be remotely controlled by shorting wires together on their control port.

The new kid is TCP/IP control via an Ethernet interface. Finally, a super high speed, bi-directional and well understood connection...

This gives a definite command to the device to perform. However, if the device is off or broken, the controller has no idea – so it's another example of one way control.

The optimal system is Bi-directional control, there is a means of the device returning a response back to the controller to determine what to do next. Often the device can be queried to determine its current state before trying to control it. This provides a complete control strategy with decisions based on what is actually happening. For example, if a universal remote control detects the receiver is on and set to the DVD input and the TV is on and set to the AV input, it should display DVD controls on the touch panel.

Traditionally, an RS-232 (serial) interface is the choice of interface for device designers and manufacturers wanting to provide a more comprehensive means of control. If you see an RS-232 interface on a device you know it's been designed with the capacity for system

integration (automated remote control) in mind from the start.

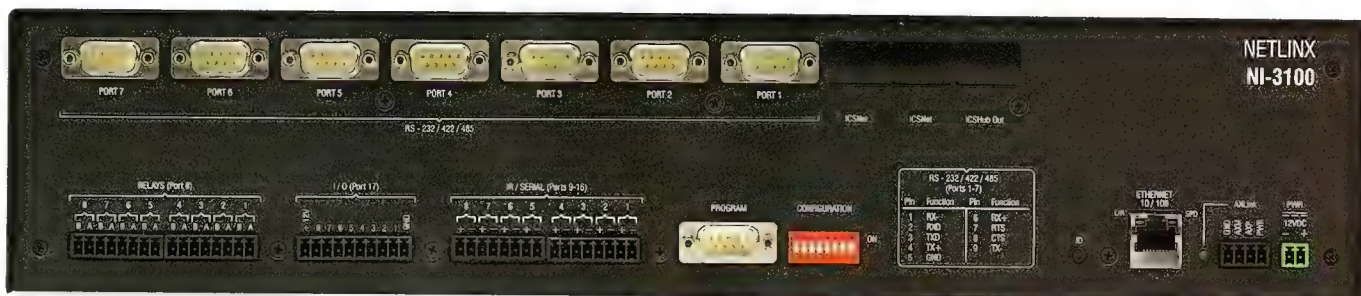
The new kid on the block is TCP/IP control via an Ethernet interface. Finally, a super high speed, bi-directional, standards-based and well understood connection that can be controlled from across the world if required. It's control Utopia!

As an example of what's on offer in the market, let's take the Denon range of home theatre

receivers. The base models of the range come with an IR remote control which allows basic control of the unit. The mid priced models also come with an RS-232 interface on the back and are much better suited to control systems as they provide a comprehensive application programming interface (API). The top-of-the-line models also have an Ethernet socket on the rear panel as well as RS232 and IR. They have a built in web interface and fully support TCP/IP control as well as streaming media. These units are very suited to integration as control is core to the design. Denon even publishes the IR codes and API publicly on its website, which is very nice of them.

Commercial Control systems

There are many vendors of commercial control systems, however, the two big names in the game are AMX and Crestron. These are both American companies and have been around for many years.



AMX NI-3100 controller from the rear... lookie all those pretty control ports!

Most of the world's largest public venues are controlled by one of these two brands. To give you an idea of how long they've been working just take a look at a list of official IANA registered TCP port numbers, at http://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers. As you'll see, AMX has had port 1319 registered for their ICSP (Internet Control System Protocol) for close to 30 years.

Most vendors offer a range of dedicated controllers, running a reliable, multi-threaded OS and sporting a plethora of control ports. The systems are usually built around an event-driven programming system that is both fast and feature-rich. TCP/IP control is also easily done as well as linking multiple 'masters' (controllers) together to allow whole



AMX Wireless touchpanel complete with VoIP capability.



buildings or even campuses to operate as one mega system. In this scenario the reverse is also possible. If you have a University with 100 tutorial rooms and 30 lecture theatres it would be highly desirable to have your control systems be able to provide information back to a central location about all the devices under their control. You could then tell when a theatre had been left on by a late class, or which projectors are requiring a lamp change.

Commercial systems also offer dedicated touch panels and button plates in various sizes and technologies. Touch panels can be mounted into walls, desks etc. or even operate on your company wifi network and control your space from anywhere in range.

More recent innovations include RFID tags and readers that allow the system to detect the presence of people, and track the movement of machinery. Videoconferencing trolley has gone missing? Simply check the system to find it.

These companies pride themselves on being able to control just about anything. Don't

be misled however, their systems are very expensive! Lecture theatres, boardrooms and the like can cost hundreds of thousands of dollars to equip and control effectively.

Closer to home, Domestic Control Systems

What about the home, though? The most common control 'system' is the humble Universal Remote Control. There are many out in the marketplace that essentially all do the same thing. They have the ability to 'learn' IR commands from other remotes and supplement them with a database of known codes. Note that these remotes operate solely by the 'IR blaster' method and only offer a basic 'macro' function at best. That is, a large powerful IR LED at the front of the remote simply blasts out the codes, one after the other. It doesn't know about anything other than IR and if you have two devices that understand similar codes, all sorts of weird shit can happen.

IR Control – Sometimes the machine is smarter than you think...

Often manufacturers include more IR commands in their devices than appear as buttons on the remote. For example, Sony TVs often understand discrete power on/off commands as well as discrete input selection. In the world of IR control, discrete codes are the goal. If you don't know what input the TV is currently set to, your control system would be much more reliable issuing a 'change to HDMI Input #1' code, rather than 'next input, next input, next input...'

Have a look around the Internet for discrete codes for common devices on such places as <http://www.remotecentral.com>.

GAMESPOT

"THERE'S A LOT FOR ROLE-PLAYING FANS
TO BE EXCITED ABOUT."

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If you need something a little more sophisticated, other options exist. You may wish to hide your equipment in a cupboard, run multiple players of the same brand, or perhaps run your projector with its RS-232 port. In this case you have to go upmarket to solutions such as those by manufacturers like Pronto, RTI and high-end Logitech products.

Here you get a remote that communicates via radio frequencies (RF) to a receiver that lives in your cupboard with your AV gear. The receiver may have individually addressable IR ports that can shoot IR commands via emitters that stick on to the front of your devices. Other options can include bi-directional RS-232 ports, or logic-level inputs to detect basic sensor information. These solutions also often offer a scriptable language to allow some programming logic rather than just preset macros.

These solutions also often offer a scriptable language to allow some programming logic rather than just preset macros.

Such systems are 'premium' domestic control systems and can cost several thousand dollars to purchase. On the bright side, however, once you have a \$2,000 remote in your house you will always remember where you left it.

Other devices now appearing on the market that are best described as 'control gateways'. These inexpensive boxes are designed to live on your LAN and allow control of an IR/RS-232/relay-based device through TCP/IP. They don't have any logic/macro capabilities themselves but provide a means of controlling a remote device from something that does. Global Cache is one

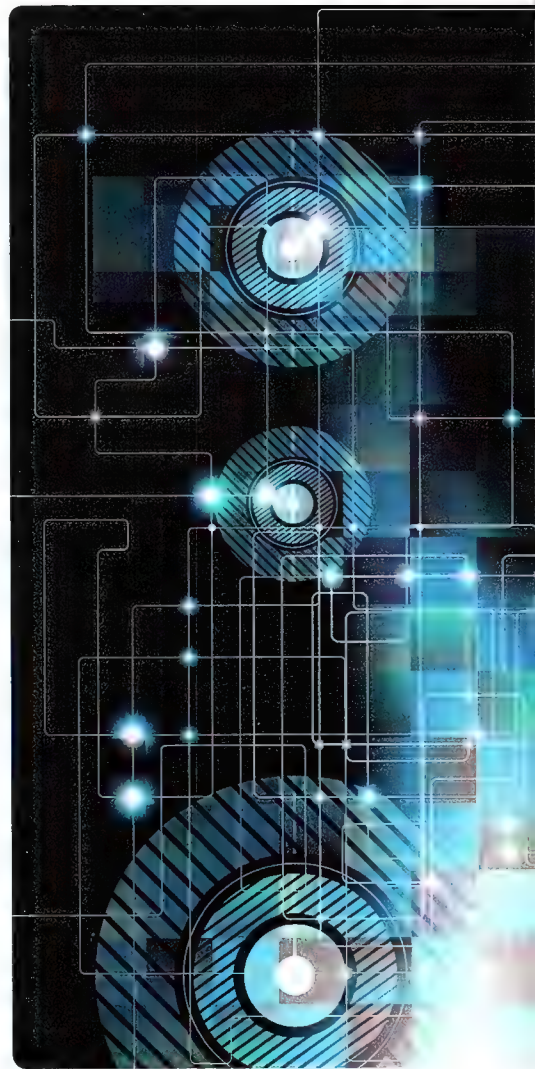
manufacturer of such devices which are generally available for \$100-200, which is quite cheap for the opportunities they allow!

The Future

Media content is gradually becoming more and more an online resource and as such, more and more devices are coming with features to stream media from local network resources, or direct from the Internet. As an example, many domestic TVs (and not just the expensive ones) are now coming with Ethernet ports built in for DLNA streaming of content. Often a feature is not implemented on a device because of the cost of the parts such as an Ethernet port and chip. While the cost is small per unit, the volume produced adds up to a large investment for the manufacturer. However, as these ports start to appear on domestic TVs, using them for

control looks to be the next logical step. Indeed, the number one question at a 2009 Sony Bravia trade show when the new models were launched with Ethernet ports, was whether they could be used for control. The answer at the time was, "Yeah, we get that question everywhere". It is coming, people!

VoIP is also a hot topic in commercial control systems. Many touch panels come with VoIP capability built in. If you have a wireless panel (think lounging by the pool, sunnies on and beer in hand...) and someone presses the front doorbell, you can simply pick up your panel, see



who they are and press a button to start a VoIP conversation with them. If they look like they could use a swim or bear pizza you just press another button to unlatch the front door!

Another über-cool thing to do is control your system using your favourite smart device. Many manufacturers are well aware of this and offer tools to allow you to design an interface app for your device and control from that. They even offer full two way control with images or titles appearing on your device. Controlling your house from another country is way cool!

So the next time you're at a gig, a large venue or sitting at the boardroom table, pause a moment to contemplate which devices may be where as they subtly facilitate the presentation of a set of slides, or conduct a videoconference. So, be it hidden in cupboards, ceilings or floors this tech is literally all around you, quietly doing its job and making life manageable.

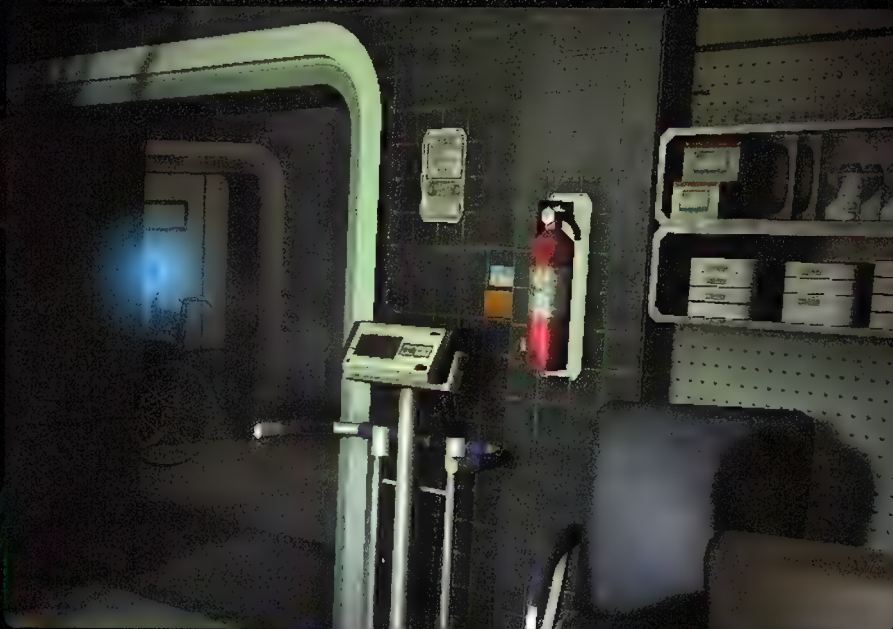
Next month we'll demonstrate how to use this tech and control your world with your 'iDevice' of choice. We'll demonstrate using a TV and BluRay, but hopefully you'll see how you can control just about anything in your digital world once you get started. Stay tuned... (P)



Philips Pronto TSU9400 Remote Control.

MAKE DEAD SPACE 2 LOOK BETTER

Dead Space 2 is good fun but it only has basic AA, which means the game can look rough around the edges. Read on to see how you can improve your gaming experience.



IN DEAD SPACE, EVERYONE CAN SEE YOUR JAGGIES

As far as games go, Dead Space 2 isn't very challenging to run. The confined spaces and short draw distances mean you shouldn't be surprised to see frame rates in the triple figures if you have a decent DX10 graphics card. With all the settings set to maximum, we saw a minimum frame rate of 46fps at 1,920 x 1,080 from our 2.13GHz Intel Core 2 Duo E6400 and Nvidia GeForce GTX 260 (rev 1) PC and its 2GB of DDR2 memory.

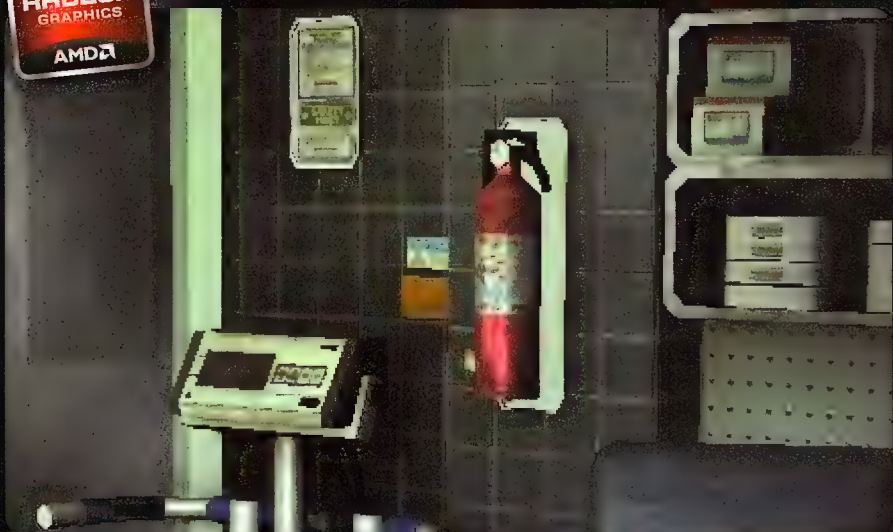
As the game uses edge-detect AA – a simple method that only applies AA to areas where there's a stark contrast between colours – there are jaggies aplenty, plus other aliasing nasties such as creep and shimmer. The more usual MSAA method of most games applies AA to the entire picture, making it a less fallible, if more demanding, technique. Unfortunately, it isn't possible to change the method of AA that Dead Space 2 uses, so you'll have to get your hands dirty in your graphics driver if you want to improve image quality.

HERO IT WORKS

GAMING EVOLVED

Those of you using AMD cards have to force the game to run MSAA via Catalyst Control Center; this results in single-digit frame rates, though, so it's a lost cause. However, if you have a Radeon HD 6000-series card, you can use the new Morphological AA (MLAA) technique. MLAA applies a filter to a finished frame, rather than applying AA as a frame is being constructed, like does with other AA techniques. As a result, MLAA avoids any conflict that hobbles performance when attempting to use MSAA with a Radeon card.

To enable MLAA, enter the Catalyst Control Center, go to the Gaming drop-down menu, and then the 3D Applications Settings page to enable Morphological Filtering. This had a negligible 5fps performance impact on the HD 6850 1GB we used for testing, but made the game look so much cleaner. However, unlike the Nvidia Control Panel, the Catalyst Control Centre has no built-in game profiles, so you need to create your own saved preset for Dead Space 2, otherwise you'll end up applying MLAA to all your games.



THE WAY IT'S MEANT TO BE PLAYED

Those of you with Nvidia graphics cards have the option of forcing the game to run traditional MSAA, but you'll need to download an app called Nvidia Inspector (see <http://tinyurl.com/NVinspec>) to do so. You'll also have to change the Shadow Quality setting to Normal.

Once you've launched Nvidia Inspector, select the Dead Space 2 profile from the drop-down menu in the top left of the window. This should show all the driver-based settings applicable to the game. Click on the setting value entry next to the Antialiasing Compatibility field and change the value to 0x004030C0. Then go to the Antialiasing/Mode and Antialiasing/Setting options, and set them to Override Application Settings and 4x respectively. Click Apply and then exit.

This tweak makes the game look much better, despite the loss of shadow quality. It does also cause a 30 per cent drop in performance, but the new minimum of 31fps was still smooth and playable.



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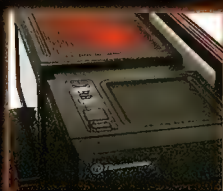
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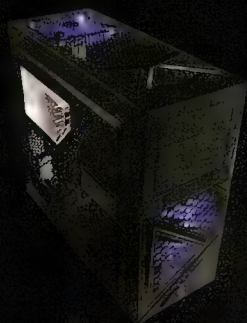


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GAMEPLAY

GAMES, GAMING AND GEEKERY COVERED... ATOMIC-STYLE

Some months are kind to our humble games reviewers; there's a steady trickle of releases – just enough to fill the pages of the magazine but not so many that we're forced to sacrifice sleep and/or personal hygiene to get through them all.

This is not one of those months.

This is one of those other months, when release piles on top of release and every time you see us we have this weird twitchy eye thing going on

because we're just so not used to being out from behind a monitor.

All of which is, of course, good news for you, because it means stacks of game reviews. We've got previews of War in the North and Operation Flashpoint: Red River, and a whole slog of full game reviews – Crysis 2, Shogun 2, RIFT...

In fact, we've been so busy we're almost grateful Homefront was so short. Almost.

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Snowblind Studios takes on the great Middle Earth. But does the resulting RPG impress?

Who says you can't have your cake and eat it too? With Warner Brothers holding the rights to film and book versions of Lord of the Rings, developer Snowblind Studios (of Baldur's Gate: Dark Alliance fame) has been given carte blanche to cherry pick source matter from both for Lord of the Rings: War in the North.

Ultimately, the team seized upon a reference in the book to Sauron (Middle Earth's font of all evil) being stymied in the north by a "handful of heroes". So while the Fellowship grabbed all the glory in their quest to destroy the One Ring, the notion of a second vital mission forms the rationale for WITN – executed in trademark Snowblind style as an action RPG.

Sno-mistaking it

While War in the North retains the RPG-lite intent of previous Snowblind works (including the EverQuest-inspired Champions of Norrath), visually it's moved on. WITN still is rendered in third person view, but the camera sits closer to the player, instead of overhead. Aiming ranged weapons (not spells) results in a decidedly non-Middle Earth sighting mechanism, with a rudimentary crosshair in place – possibly a placeholder as we were informed elements of the HUD were works-in-progress. The closer angle makes combat a more intimate affair than the detachment of an aerial, isometric 3D camera, without the unwieldiness of trying to hack and slash in first person mode.

This intimacy is important because Snowblind and Warners are going strong on

the brutal nature of combat in Middle Earth. Traditionally, Lord of the Rings titles eschew blood and gore for a more genteel experience, however WITN is being pitched as a mature experience. Beheadings are possible, and gouts of blood are freely thrown around. It's not Mortal Kombat, but it's definitely not your Dad's Lord of the Rings: Volume 1 on Amiga.

Short cuts...

Being a Snowblind game, you can expect minimal lore, with maximum fighting. The game has three archetypes – Human (caster capable of protecting the team as well as damage), Elf (ranged damage via bows and arrows), and the

Dwarf (tank/melee specialist who freelances at times with a crossbow). What Snowblind is aiming for is the three working together as a smooth unit. The Dwarf holds the attention of the bad guys via pure melee damage and special moves like a morale boosting shout, the Elf bombs away at range with specialised arrows, and the Human protects the group from too much damage while dishing out the pain as well.

While there's a reasonable level of definition amongst the roles, there's nothing stopping players from dabbling in different equipment or combat styles – you just won't be as efficient. Each class has an array of special moves that



are distinct to them – the Dwarf can fight at range, but he won't be able to hea, while the Elf can engage in melee combat, but won't be able to taunt the monsters. In the end players are likely to gravitate to their 'proper' roles for the sake of efficiency.

Buttressing these core roles is the game's talent system. More a grid than a branching tree like some games, Snowblind made the

place, a perma-pixel from doom. We deserved to fail – we were silly enough to let ourselves get corralled into that position. However the level design conspires to give us a free pass. Forgiveness in games is an admirable quality, but it's best driven by gameplay – not level design. Besides, if the tables were turned, we'd very much like the opportunity to send the ogre tumbling off a cliff edge; unless the in-game

Players are pretty much funneled through terrain – there are invisible boundaries you can't cross which tend to frame your progression.

interesting decision to allow players to retain all their talent points – which accumulate as you level up – for subsequent playthroughs of the game. Ultimately, after a few run-throughs, players will be able max out every possible skill in the game.

Play it again, Sam

The Lord of the Rings franchise remains a powerful one, but WITN abounds with little cues that give away its not-quite AAA status. Players are pretty much funneled through terrain – there are invisible boundaries you can't cross which tend to frame your progression. That's not a condemnation of the approach, but it does lead to limitations in combat. When an atmospheric battle against a gargantuan enemy capable of knocking us over had us backed against a steep drop, we weren't sent hurtling into the void. Rather we would just be knocked down in

scripting calls for it, that's not going to happen.

Further lightening the load on developer and player alike is friendly fire – or the absence of it. A Snowblind staffer said the argument for and against being able to harm your own party was a hotly debated topic, but ultimately Snowblind decided against it, and it's easy to see why. Combat in WITN can be a messy affair – lots of damage gets thrown about, and not all players are attuned to MMO/raider axioms like "range shalt not sit amongst the melee".

Forcing parties to always have three players – A Dwarf, Human and Elf – also likely saves the Snowblind team some development time. A trio of bow-wielding Elf players could probably massacre any enemies before they got within striking distance, but throw in a caster and a melee-oriented class and things get more balanced. Putting together cut scenes is also a lot simpler when you can block out the same





The mithril lining

The set group composition theoretically allows Snowblind to reduce squabbling over loot drops in the game, but the studio seems to have a good handle on that anyway. All loot items can be freely swapped between players, and players all receive different loot when they open the same chest, essentially trebling the chance you'll get something useful.

The interface players use to equip their items is intuitive and simple – players highlight a slot on a diagram representation of their body, and the gear options are listed on each. There's no need to hunt and peck through inventory bags for equippable items. It's the kind of streamlined approach and UI minimalism that Snowblind made their name

on, and while it isn't a revolutionary inclusion, it's something players will be using with reasonable frequency.

On the 'watch list' of issues we'd expect to be fixed by release include some errant collision detection; when fighting an ogre-sized foe on one encounter we were managing to still hit it while faced away. A subsequent playthrough didn't have the flaw reappear. Inverted Y-axis aim wasn't present in the build we played, but we'd assume it will be incorporated by launch.

Something less likely to be addressed is the enemy AI, which in the level we were shown was basic. Ranged foes attack from afar, while melee attackers close in. Multiple playthroughs of the demo didn't seem to evidence anything in the way of sophisticated tactics from the orcs and ogres, just a propensity to charge in.

'actor' types and not have to worry about a possible all Dwarf ensemble.

Further reinforcement of the non-dynamic nature of the cut-scenes came in one of our play sessions. When one of the party forged well ahead of the other two, he reached a point that triggered a cut-scene – featuring all three characters in it. However once interactive play resumed, the stragglers were once again relegated way behind. Trivial in the context of telling a story – particularly in an action RPG – but more evidence that the fixed group dynamic has allowed Snowblind to save time on how they've generated their cinematics.



An artistic take on War in the North

Philip Straub, the Art Director on War in the North, is a lucky man. For a concept artist, there are few richer worlds to work on than Tolkien's mythic Middle Earth. And with the opportunity to work so closely with the movie property, while designing and fleshing out unexplored and unseen areas, he's pulled out all the artistic stops.

"[We had] a unique opportunity to explore uncharted territory within the universe created by J.R.R. Tolkien. It was very important that we stayed true to the lore, but also brought something new for the audience," he told us.

So how do you combine the two, and support a coherent story in such an action driven game?

"The first stage of developing visual beats is to create a mood board or rough storyboard that takes into consideration a baseline story and enhances it with all the artistic tools available."

He described five ways to enhance the story using design tricks – colour, light, weather and atmosphere, spatial relationships and shape language. The last two are particularly interesting.

"We use spatial relationships within the environment to create a sense of claustrophobia. Conversely, we can apply a sense of scale and openness by highlighting expansive vistas to contrast the feeling of containment," he said. "We can then take it one step further and begin defining specific shapes in the environment to further enhance the emotive experience of the game. For example, we use sharp angles and twisted shapes in the trees that apply a visual metaphor of skeletal fingers reaching down toward the player."

Of course, most of a player's interaction with the landscape will be through its characters, so it's paramount that they look the part too. However, character design brings its own unique challenges.

"With our player characters it was extremely important that we paid attention to silhouette, color palette, materials and the positive and negative shapes within the patterns of the costumes," Straub told us. "Specifically, we applied a unique color palette solution to our Dwarf, Human and Elf. These color solutions allowed the player characters to be immediately recognisable and easily differentiated from each other in the game space, even from the player's periphery vision. Next, we took this concept further by creating an algorithm that increased the quality of the materials available in the characters costumes over time."

Essentially, as characters level, so do their costumes and clothes. Yet, RPGs always bring a certain... wild kaleidoscope of designs once players start combining the best items. "what really sets War in the North apart is that of the nearly 1,000 possible costume variants in our game, they always look like they fit together. Simply put, this solution enabled us to avoid the typical "clown suit" you may have seen in some RPG character customisation where inevitably pieces are mismatched."


Return of the King?

As long as Lord of the Rings fans know what they're getting themselves in for, War in the North shouldn't disappoint. Snowblind Studios isn't BioWare Mythic, and WITN isn't trying to be Dragon Age. It's trying to transplant Lord of the Rings into an accessible, faster paced RPG format. The fixed party system arguably does the developer more favours than it does players, who might desire some flexibility, but the action RPG genre dwells more on keeping the encounters coming over loading the game with exposition via cut-scene.

While the game is destined for the PC as well as Xbox 360 and PlayStation 3, the control is crafted with an eye to console friendliness. While elements of the user interface are still in progress, the actual playing area is relatively clean, and players won't have to worry about the UI concealing points or persons of interest.

If one were to strip genre considerations out of the mix and try to figure out where WITN would sit in the pantheon of LOTR-inspired titles we'd expect it to place top three. Lord of the Rings Online is the definitive treatment of the property, and it's unfair to expect a plucky action RPG to compete with a product borne of so many years of development pre-and-post launch.

We'd then have to give the Battle for Middle Earth real time strategy game second place nod. Outstanding production values and a real attempt to make the RTS newbie friendly were fortified by real efforts to make the game canonically sound (as much as the genre permitted).

After these two, War in the North seems a good candidate for third – no small achievement given the long history of LOTR-flavoured games. What it may lack in level design finesse or gameplay depth it makes up for in accessibility and a sound teamplay dynamic. And the (expected) M-rated action in the game reflects the book and film's oft bloody nature more accurately than the succession of titles that have sought to play it safe.  JK



PC, 360, PS3 (previewed on 3x360 via system link)

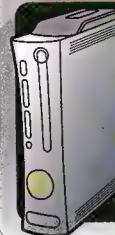
Developer: Snowblind Studios
Publisher: Warner Brothers
Interactive Entertainment
Website: www.warinthenorth.com



Simple, action-based fun.



Very linear;
not much depth.



Anticipation rating

Note the most deep look
at Middle Earth, but fun...

79%



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Homefront

Is this what singleplayer gaming has come to? A campaign shorter than some movies?

The problem with gazing into a crystal ball and making bold predictions is the out-and-out risk. We did that with Homefront, pretty much calling it as a game of the year contender before it had even come out – we'd played a good wedge of the campaign, and a fair bit of multiplayer, on multiple platforms, and what we saw was looking good.

So why, then, now that the game is out, are we feeling a touch embarrassed about our prognostications of greatness?

Well, it's because we got it wrong. Picking whether a game's going to be good or bad based on carefully managed previews is always going to be tough, and in this case, we flubbed it. But we're not the only people to blame – fair suck of the fail-sav must also go to THQ, who hyped the living bejesus out of the game. That level of hype is a problem because while it's more or less adequate, Homefront is not the Second Coming THQ's been promising.

But why not?

Is that it?

We almost can't remember the last time we played a satisfying singleplayer campaign in a shooter. We might have to go back as far as the first Bad Company game, actually, but it certainly isn't going to be Homefront's offering that leaves the next good impression.

It's a moody enough affair, set in the Korean-occupied future of the USA, and the game certainly looks good, but a lot of that is really only skin deep. Look closely and you'll discover all the usual FPS bugbears of linear level design, poorly scripted AI and press-X-to-x that we hate about modern gaming. If you play the game in the spirit it's intended, it's good, but our real main issue is even then... you're not going to get your money's worth.

Homefront's singleplayer is almost criminally short. The fastest playthrough we've heard of is about two and a half hours, which is... just wow. Really? To get anything close to a mere ten hours you've got to play on the hardest difficulty, and even then you'll spend most of that time simply restarting levels.

Mechanically the game is fine, offering some sharp ballistics and some really deadly ballistics modelling. But there's just too damn little of it.

Not really better with friends

Most modern shooters, however, rely on their multiplayer component for real success and longevity, but, again, Homefront's online portion is so far more hit than miss. Of course, it's worth pointing out that we felt much the same way about Bad Company 2, our current go-to FPS, but patches and careful attention from EA and DICE fixed that up pretty fast.

Homefront's multiplayer troubles start with the server browser. As is so often the case, it's buggy and prone to crash. Just refreshing the server list sees the game lock up, and we're not alone in that. What's more, the filtering options are limited to non-existent.

In-game, Homefront's solid enough on many fronts, but not really outstanding in any of them.

If anything, the game's brutal weapon physics, work against online play. The default mode is closer to many other games' Hardcore settings, yet without the moderating influence of things like bullet drop snipers become very powerful. The maps are good, but limited to just four at release, and while the drones and range of vehicles are good, you really end up missing BC2's destructible environments. Any tank duel that can be won by clever use of picket fences is silly at best. Plus, like many FPS games, spawning can make or break your experience, and too often you end up dead before you've even worked out what way the objective is.

There's a solid game there, but it's going to take some clever patching and support to kick it into gear. And quite likely more than that to earn back the trust of a lot of disappointed, hype-sick gamers. **DH**

PC, Xbox 360 and PS3 (reviewed on PC)

Developer: Kaos Studios
Publisher: THQ
Website: www.homefront-game.com

Gameplay

Too short, and buggy/frustrating online.

68

Graphics

A colourful and detailed world let down by its game.

80

Sound

Great VO, but some overly bombastic soundtrack choices.

79

Overall

Sadly, a step backward from Kaos' excellent Frontlines.

70%



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Operation Flashpoint: Red River

atomic
PREVIEW

The mil-sim franchise takes a different tack with its latest title – and we're kind of liking it.

One of our fondest gaming moments came courtesy of the original Operation Flashpoint.

It was our first stint on Atomic, and the game's local publisher – and I really can't remember who that was at the time – hosted a press event at a paintball venue. We got to play the game, which was awesome fun, and then taken to the field for some real-life, pigment-powered action.

We love our paintball.

We also loved Operation Flashpoint – there was literally nothing like it at the time. Gruellingly realistic, graphically intense, PC-only... it was made for Atomic. We lost days, weeks even in the sprawling singleplayer campaign, and multiplayer was simply delirious fun.

However, time has not been kind to this franchise. As the FPS grew into monstrous popularity on the back of more run-and-gun shooters like Medal of Honor and Call of Duty, Operation Flashpoint hid itself with more convoluted mechanics, ever-gritter levels of realism, and graphics that could – at best – be called workmanlike. The series reached a serious low point with Dragon Rising, the last game, and during our hands-on session with Red River the Codies presentation pretty much admitted the game was a mess.

Which leaves us with a new game, and new mission statement.

Codemasters has decided to ditch the relentless simulationist aspect of the game, but at the cost of the realism and detail that franchise is known for. At first, this might seem a counter-intuitive concept, but it's not until

you play some of the campaign missions and multiplayer modes that you start get exactly what Codies means.

We played a single mission of each, and both Red River's campaign and online play are all about co-op. You can play the campaign solo, but after even just a taste of the game – and on console at that! – we feel co-op's the way to go.


Our mission was simple – link up with a convoy, clear the road and villages ahead of it, and stay in one piece. Red River offers a vastly more simplified UI, which immediately helps make the game more approachable, while also taking away a lot of the overdone micromanagement. Weapons ballistics feel very challenging, but still accessible. Finally, enemy AI can use buildings and height for ambushes, and can make even better use of crossfires to cause you some serious hurt.

In short, Codemasters really seems to have got the balance just right. We just hope the friendly driving AI is a little... kinder in the full release, as they tend to roll over anything in their way, including other friendlies.

The game, however, really comes alive in the online co-op modes, especially when you play in Hardcore. This mode strips away pretty much every bit of the HUD – even your compass! You're then expected to clear villages, rescue downed pilots or defend a location. You can bring up a compass bearing, but that means you're not shooting – but since you need to know where you're going, timing the right time to pull out the old compass and map is an essential skill.

So too are proper infantry tactics. Having a sniper on overwatch while rifleman advance under suppressive fire from a support weapon is a skill you'll need to master, but once you do, you'll feel like the real thing. The AI in these missions is just as strong, able to fall back from opposition and reposition for another attack or just to regroup. It's a refreshing change.

Graphically, it's still hard to judge where the game's at. Trailers and gameplay videos suggest it's going to be pretty, not to mention expansive, but on console it's hard to confirm that. We do have some PC code we're about to start testing, so keep an eye on the site.

So far, so good, Codies.  DH

PC, 360, PS3

Developer Codemasters
Publisher Namco Bandai
Website www.flashpointgame.com



Tight tactical gameplay; strong AI; simplified structure.



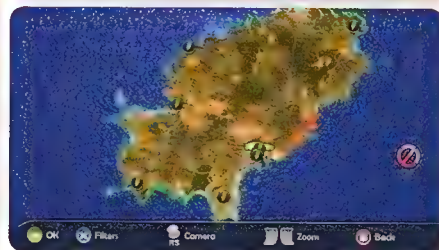
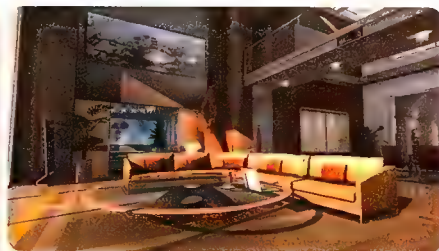
Friendly AI isn't; jaggie console graphics.



Anticipation rating

Should be a big improvement, but we're a little gunshy at the moment...

80%



Test Drive Unlimited 2

Unlimited scope, limited execution.

As a persistent open world racer inhabited by real drivers, Test Drive Unlimited 2 (TDU2) is incredibly ambitious. In pursuit of their lofty racing MMO goal, Eden Games has thrown in so much extra content that at times the game seems to be drowning under the weight of its own ambition. The idea and framework Eden has laid down is great but it's not been able to nail it.

A major part of the experience is the single player championship. Races are split up into Off-road, classic car and asphalt race series and take place on an absolutely massive recreation of the Spanish island of Ibiza and later the Hawaiian island of Oahu, where the first game was set. You're tasked with ascending up the ranks to become a famous racer. Eden's attempted to attach a story to the game, and while it adequately introduces the other racers and gives some context, it's really quite laughable.

Eden has attempted to add a lot of personality and user involvement into the standard racing game format. You can buy houses, new clothes and even give your avatar a complete surgical makeover. While you're in your car for most of the time, shops, car lots, your houses and garages are presented in a

first person view that you can walk around and explore.

Progress in the game is achieved by making your way through 60 player levels, split up into four main categories: Competition, Collection, Discovery and Social.

Competition is as you expect: progressing in the championship, unlocking new events and completing various challenges littered around the islands. Collection relates to the amount of things you acquire, whether they be cars, houses, clothing or anything else you accumulate in your rise to the top. Discovery goes hand-in-hand with Collection and relates to your exploration of the island and the dealerships and stores you unveil in your travels. Lastly, social predictably relates to your dealings with other users – online races, interacting in racing clubs and so on. To reach the magical level 60 you're forced to sample all the aspects of the game.

If connected to Xbox Live (or PSN) while playing the single player challenges, the islands are populated with real world users doing their thing as you cruise around. Simply flashing your lights at them can initiate various competitive and co-operative racing interactions. You can also create racing clubs that people can join. The online interactions show a lot of potential, with some fresh and inventive racing ideas, but server issues hold them back. Patches have been promised but at the moment it feels like we can only look at the immense promise of the MMO portion of the game through a frosty window rather than being able to openly embrace it.

Handling in the game is very jarring at first. It feels sloppy and unrefined. There are three levels of driving assists but none feel quite right. It feels stuck trying to offer aspects

of simulation and arcade racing in a rather disjointed manner – this grows on you but you never feel totally in control of the car. Racing AI is less than ideal and many races are far too easy and annoying.

The environments and weather effects of the tropical islands look great in patches but everything else falls behind. There are aliasing and terrain pop up issues and the framerate is prone to the odd hiccup.

The game is a slow burner; it takes a while to appreciate the immense amount of content that Eden has thrown at us. The exploration and collection aspect works well, and simply driving around the massive and well-realised islands with others is great. There is much to do and a lot of fun to be had but the inconsistent experience and littering of bugs makes it a hard sell. **DW**

PC, Xbox 360 and PS3 (reviewed on 360)

Developer Eden Games
Publisher Atari
Website www.testdriveunlimited2.com

Gameplay
Great premise let down by sloppy execution.

72

Graphics
Solid environments and effects, workmanlike elsewhere.

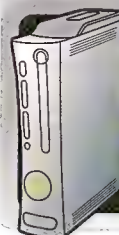
78

Sound
Average, with horrid voice acting.

68

Overall
A game that leaves you wondering what might have been.

73%



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Crysis 2

New York gets hammered in an alien invasion, the crysis franchise gets hammered in a console conversion.

There have been few games with as big an impact as Crysis. Billed as the game that would not be properly playable until years after its release, it's a benchmarking tool we still use to this day. And while it didn't offer the most unique gameplay, it at least delivered a truly open world shooter in a truly lush and destructible environment.

Which, we're sad to say, does not apply as description of Crysis 2. It is linear, lacking in anything unique, and it is no way the PC-pushing game that we'd been hoping for. We're not saying it's bad... but it's far from an ideal PC experience.

What has New York ever done?

We will say one thing for the game – it's got a brutal setup. New York's the site of a stealthy alien invasion by way of a curious plague that's afflicting residents, and it's your job to go into a closed off New York and rescue the only scientist that can save the day. You start out as a grunt, but along the way you get upgraded to a nanosuit soldier, shot at by aliens and humans alike, and knocked out an awful lot.

You'll also get to see a lot of 9/11-esque shots of collapsing buildings, which probably tug on the heartstrings of gung-ho Americans a lot more than local gamers. Nonetheless, CryEngine 3 does deliver a pretty convincing dust cloud, so more power to the devs.

Crytek made a lot of noise about calling New York the urban jungle during the game's pre-release hype-phase, and the company's half delivered on that. It's really only by comparison to, of all things, the first Crysis – which delivered an actual jungle – that Crysis 2 starts to look run of the mill linear. Crysis may not have been perfect, but it's true 360 degrees of openness delivered some great gaming moments that resonate with us today – and they're moments that only we are going to have experienced.

Crysis 2, on the other hand, funnels you into seemingly open environments which are fun

enough, but not really open, either. These encounters can be a lot of fun, don't get us wrong, but they'll never deliver the some unique kick from the game's predecessor.

However, there's more to the game than the setting. The real star is arguably the Nanosuit you wear, which delivers superspeed, the strength to leap vast distances, boosted armour, and stealth capabilities. Matched with your choice of effective weaponry (and Crysis 2 may well boast the single most





satisfying shotgun in all of gaming), the way you employ your suit, and how you tackle each encounter, does deliver a lot of freedom. However, it also holds your hand, pointing out to you tactical options in each phase of the game. EA may promise that you can be the weapon, but you never feel as bad-arse as you did in the original game.

Console limitations

And here's where we whine about the consolification of PC games. It's a familiar refrain, but it's rarely been stated just how much impact the limited console architecture has on game design as when Cevat Yerli spoke about the topic just prior to the release of Crysis (http://www.youtube.com/watch?v=AVsT4D2_VTI). You can watch it, but the gist is this – there's simply not enough RAM to deliver an open world like Crysis – you have to stream the levels.

When you understand this, you understand why Crysis 2 has moved to an urban setting, and you understand so many of the decisions that have influenced the game's story. By having a viral contagion, you can justify having entire streets blocked off by roadblocks and checkpoints. It all channels the action into

paths that force you to take a certain amount of time; enough time for the next bit of open encounter area to load.

The urban environment also means you can justify having far less destructible terrain, and makes it far more easier to set up for scripted events along game checkpoints you know players are going to have to pass. It is an absolutely sensible developer shortcut, but it's also what stops Crysis 2 from being half as good as a dedicated PC title.

And don't get us started on the strange graphics setup the game boasts – you can pretty much only choose from Gamer, Advanced and Hardcore, which is... lame. In the extreme. Combine that with some serious issues with ATI Crossfire, which cause image flickering that makes the game almost unplayable (a patch is coming), and our review experience was a touch meh. We have played the game on single-card setups, and it looks fine though. Not as good as the original, though, it must be said.

Spawning hell

The nanosuit features heavily in the game's CoD-inspired multiplayer, too. For some, this

Stop hitting me


Okay, we have to ask – what is it with the sudden fad of knocking out the player in single-player campaigns. Homefront does it almost monotonously, and Crysis 2 isn't much better. It started with Modern Warfare 2, and since then it seems to have become some strange storytelling shortcut.

And it's annoying!

One of the cardinal sins of any interface design is when you frustrate the user by taking away their control of the experience. We hate it in OS and application design, and it's just as unwelcome in modern shooters. We play games for a sense of control, people! What we don't want is to be putting up with scripted scenes of people helping us out of water/rubble/explosions/bowls of muesli (okay, maybe not) – if we're playing an FPS we probably expect to be able to do that kind of thing ourselves.

is a real winner, but for us, it simplyacerbates what is becoming a recurring issue in games on any platform – spawning. Modern Warfare 2 featured some truly horrendous spawn issues, and even our favourite Bad Company 2 can have some spawn problems, but combine bad spawn locations with the ability to cloak and you have a singularly frustrating experience.

Get around that, and there's a range of hooks – there are classes to customise, suit powers to play with, and weapons to unlock. It's a rich experience, but an at times uneven one given how many different tactics and abilities can come into play even in the one session.

And that's a statement that pretty much sums up the game. It's not bad, but nor is it going to stop us from playing Bad Company 2 any time soon.  DH



PC, PS3, Xbox 360 (reviewed on PC)

Developer Crytek
Publisher EA
Website www.ea.com/games/crysis

Gameplay
Some strong parts, but at times linear.

80

Graphics
Undeniably strong, but not groundbreaking.

86

Sound
Satisfying weapon effects and music.

84

Overall
Not quite the second coming we were hoping for.

84%



The mighty hammer of the emperor joins the fray in this latest DoWII expansion.

There are entire standalone, non-expansion games with less content than the latest Dawn of War II instalment. It drops pods onto PCs fit to brimming with stuff, and that's pretty much what we'd expect from the company that taught us that expansions need not be a way to merely edge a bit of new content into a game at the expense of gamers' wallets. Relic delivered consistently standalone expansions for the Original Dawn of War, and the last Dawn of War II expansion was much the same.

But Retribution features an insane amount of content to get your teeth into. Whether you believe the Emperor is the true manifestation of humanity's destiny, or just want to watch the galaxy burn, this game has something for you.

So many ways to die

There's a campaign in Retribution for every race presented in the expansion, including the brand new Imperial Guard, playable now for the first time since they showed in an Dawn of War expansion, Winter Assault. These campaigns are not long, and the opening levels are repetitive tutorials, but there's a lot to get into as they progress.

Perhaps most intriguing are all the vastly different play styles on show. By now, you might have gotten a little tired of the power-armoured warriors that are the Space Marines, so a little change of pace is very welcome; it's a good thing these are some serious pace-changers, especially when it comes to the depth of character customisation from each race.

The Orks, as you'd expect, are brutal and close-in specialists with a ribald and violent sense of humour. If you're not quietly sniggering

to yourself as you cause explosion, after explosion, after explosion (and that's just one of the Orky characters!), you're not playing it right. Chaos brings a similar sense of ultra-violence, but with some more suitably icky flavours, like Plague Marines. These worshippers of the Chaos god Nurgle can infect the enemy, buff your own troops, and cause widespread damage.

The Eldar are more suitably... enigmatic, with elegant weaponry and lots of highly mobile

troops. They're kind of like fencing, compared to the brute force of other factions. And speaking of brute force, there's the new kids on the block, the Imperial Guard.

They're not for everyone, we admit, but we should also admit that the largest single army we own for the tabletop version of the game is a Guard army – we love Guardsmen. Pretty much every other race is superstrong, immortal, powered by mystical energy... the Guard have what most in the hobby refer to as t-shirts and





or even just as a meatshield while your heavy weapons and vehicles do the job.

It ain't pretty, but it does the job. It can also be argued that the Guard have the funniest banter between their heroes, and arguably the coolest of characters – the Commissar. This guy's a motivational leader who can make Guardsmen around him rally, attack, and all kinds of stuff – but only by killing one of them.

Now that's grim.

There is only war

The multiplayer options are just as rich, though some are hardly changed from the original.

The ability to play through each campaign in co-op mode is certainly a very welcome addition, and the Last Stand mode of the original game makes a welcome return – in those mode you and two other players stand off against endless waves of enemies, levelling your characters as you go. It's a cinematic and very unique hoot.

The Imperial Guard are well-suited to the game's more standard multiplayer, since their vehicles are easier to come by and relatively powerful, but at the same time we still feel this is the game's weakest link. Maybe it's because of our desktop leanings, but the game seems to lack punch in this area – it's either too long, or over too fast, and the unit synergies never quite seem so natural as in the campaign.

Regardless, even with its niggles, for an expansion Retribution is an outstanding achievement, packing in plenty of content and bringing back everything that's great about Relic's adventures in the 41st Millennium along with some new factions and units. It's a great place for anyone looking to get started with Dawn of War, and should be just as much fun for established fans. **DH**



flashlights. That is, lasguns – next to useless – and flak armour – next to useless. But there are a lot of Guardsmen, and you can use large units of them to mob opponents with firepower

PC

Developer Relic
Publisher THQ
Website www.dawnofwar2.com

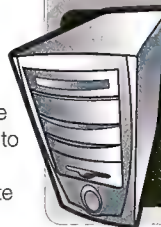
Gameplay
Lots of campaigns, co-op, and Last Stand. Wow.

Graphics
Just starting to look a little old.

Sound
I never pictured the Guard as that British...

Overall
Good work, Relic – now pay attention to Space Marine!

89%



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The latest contender in the MMO market brings a lot to the table... so why aren't we playing it?

It's a common belief that you've got to have balls of mithril to enter into the MMO market these days. Not only is it a developer time-sink nightmare, and an incredible outlay in terms of server hardware, but there's also the lingering gorilla in the mist that is World of Warcraft. For better or worse, games like Rift, Trion Worlds epic fantasy MMO, will always get compared to Blizzard's juggernaut – either through disgruntled WoW players looking for an alternative, those who think WoW's benchmark cannot be surpassed, or even those who think that for any MMO to cut the mustard it must depart from Blizzard's model of UI design.

But Rift really does deserve better. It brings a lot of polished mechanics to the table, a rich array of player options, unique modes of gameplay and a rich world for it all to happen in. However, it's also worth pointing out one even more important thing – we've stopped playing it, and really don't have any passion to go back.

But that might just be us...

Body building

The whole setup of Rift is pretty much right there in the title. Due to dubious shenanigans to try and win a decades-gone war, the world of Telara is being torn apart by interdimensional rifts that can literally pop up anywhere. The game features two factions – the Guardians, who are reincarnated heroes, brought back to fight the good fight, and the Defiant, a technologically advanced faction that prefers

personal choice to Gods-given destiny. Telara itself is a pretty stock-standard world, full of elves and dwarves, and slightly different versions on the Defiant side, and all kinds of familiar fantasy tropes. It is, however, riven by war, and not the more-or-less carebear kind of war you see in WoW. No, this one's nasty, and has much more direct impact on gameplay.

In fact, while many compare Rift to WoW, it's actually a lot closer to EA's not-quite-there Warhammer Online. The faction-based combat, specific battlegrounds, and the way the rifts themselves draw all players into the effort

to close them is very similar to Warhammer – it's just shinier, and, to be honest, better implemented.

Character creation does a good job of getting you started on the game, and there's a wealth of options to get your toon looking just right. Rift's facial slider, in particular, is very well-implemented – it's more of a three-way axis, and an elegant solution. However, it's worth noting that choosing your class is a pretty unique setup. At first, during character creation, it's pretty limiting, as there's just the four basic classes – cleric, mage, fighter and





rogue. You get more choice almost the minute you start playing, though, and that's when the real crunchy side of the game kicks in.

Through the entire early portion of the game – the newbie zone, basically – you're still choosing aspects of your character. Rift takes the unique approach of offering Souls, or sub-classes, that you can pick three out of eight available for each base class, and then combine in any way you want. What this leads to is you effectively choosing three talent trees to work toward and combine skills from. It's, arguably, just about the most customisable class system we've seen in an MMO yet, with a lot of flexibility to create interesting, non-cookie cutter builds.

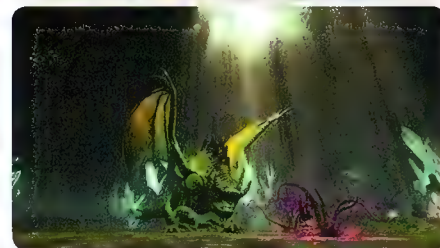
Of course, MMOs being what they are, the most effective builds have pretty much been worked out, but if that's not your priority, you'll dig the effort Trion's gone to in this respect.

Body breaking

Of course, all the best character creation mechanisms in the world, and the detail of that world itself, aren't worth much if there's not a lot for your characters to do. Thankfully, Telara's full of stuff.

First up, there's a host of server types, from straight PvE all the way through to RP/PvP, and everything in between. It's great to see that range, and with the incredible number of servers – dozens each for Europe and North America – there's room for everyone. That said, the pure PvE side of the game, or at least the questing aspect, is probably the most boring. This, to our mind, was typified when our Gods-born Guardian, brought back to life after being twenty years dead, was called upon to put out burning barrels... "Huh?" we thought, "We're a demi-god, hello?!" But it at least pushes you through the world itself well enough. And as you do travel, you'll likely run into a Rift or three...

The Rifts are a little like Warhammer Online's public quests. When a rift forms, and demonic energy starts flowing into the environment, anyone can go fight it, and earn loot based on their input. But they're not static, like Warhammer's public quests. Instead, they propagate at random points and at semi-random times, based on server pop. It's a great idea, and as untended rifts grow to the point where quest givers are being killed and venter towns taken over, it lends a real vitality to the world.



On the other hand, in one instance we were totally cock-blocked by the game when we logged in on a spot over-run with demons five levels higher than us. So, yeah... not fun.

There are Warfronts, which are effectively Battlegrounds, and even some very solid world PvP if that floats your boat. Server pops are all healthy, so there's almost always folk around to help defend quest givers, grief the other faction, or deal with rifts.

So what's our problem?

We can only talk about our own experience, of course, and the fact that Trion's continuing to add servers suggests we're in the minority, but in our opinion the game just doesn't quite hold together. Telara doesn't seem a strong enough world, and the motivations of the factions seem similarly weak. There's great gameplay, to be sure, but there's no real reason for it. And even the combat pacing, which is otherwise much like any other MMO, seems a bit slow and lethargic. But, again, we know other folks think it's just fine.

Rift is a thoroughly skilled effort from Trion, but it just doesn't inspire us to stay logged in. Back to Lord of the Rings Online... **DH**

PC

Developer Trion Worlds
Publisher QVS
Website www.riftgame.com

Gameplay
Varied and rich, but at times too arbitrary.

79

Graphics
Great looking world, with some marvellous metallic textures.

87

Sound
Easily the most disappointing aspect, especially combat.

70

Overall
We don't think there's anything wrong, per se... but it's not for us.

81%





The great strategy series returns to its roots for the greatest game of all. Or is it?

It is fair to say that we are Total War fanboys here at Atomic. There's not been a Total War game we haven't liked – and we've played them all from the very first Shogun. So it goes without saying that we peed ourselves just a little when Creative Assembly announced a return to where it all started, bringing everything the company's learned – and a lot more besides – to bear on Feudal Japan.

And oh, what a glorious thing it is to return to Shogun, the game that started it all with its 2D sprites on a rolling 3D landscape, with units up to 200-men strong, in the most amazing 3D, warring across a countryside that it almost riotous with colour and movement.

It is also, however, a slightly rocky return, as this is arguably one of the rougher launches we've seen in the franchise's history – so how does that balance out the experience?

Five rings, no waiting

There are myriad ways to get to grips with Shogun 2 – instant battles, historical refights, multiplayer battles, and even a new and very intriguing 'avatar campaign' that sees you accruing experience and upgrades in an almost CoD-like fashion as you conquer Japan. But we're purists, and as such, we always go straight to the biggest campaign we can find.

Like in Shogun, in Shogun 2 you play as a discrete clan fighting to dominate Japan, and ultimately rise to power as the titular Shogun. However, there's a lot more clans to choose from this time around, though the usual system

of bonuses, such as one clan being better archers, another being better at farming, etc, apply. From the minute you choose that clan and drop into the game, it's easy to feel that the game's more or less the same – the music and the UI do remind one of the original. But the increase in the game's complexity, and the challenge of running your clan in this difficult historical period, immediately become apparent.

So too does the incredible beauty of Creative Assembly's work. Whether it's the interstitial screens of period artwork, and the carefully chosen quotes that accompany each loading screen, or even the voice acting of each rival

Daimyo or your advisors, this is a wonderfully detailed game.

Even prettier is the game's strategic layer, which depicts either a flat parchment-style map (for regions you've not yet uncovered), or a glorious 3D Japan complete with sharp mountain peaks, deep river valleys, and vegetation that changes with each season. In particular, Autumn is stunning, when falling leaves of orange and brown drift downward – it's like a woodcut come to life.

However, it's in the actual battles themselves where Shogun 2 stuns the most. Rivers run, waterfalls trickle over great drops, and forests





sway in the breeze, along with swathes of flowers and undergrowth. Torches light small villages and great castles alike, and if a coastal mist has come up, the effect is awe-inspiring. As to the units themselves, they're bigger and more varied than ever, not to mention much more detailed. Even rain effects have been added to soldiers now, with lacquered armour now showing rivulets of water streaming off the soldiers.

It is, without a doubt, the most epic Total War instalment to date.

Tickets to the (Sho)gun show

However, a strategy game without a robust and challenging AI is nothing. If there's been one weakness to past games in the series it's been just that, and Creative Assembly's growing commitment to developing the multiplayer side of the game is proof that even it sees the challenge. That said, Shogun 2 has arguably the strongest AI to date, though it still has some alarming weak spots. For instance, while the tactical AI is far more adept at finding the right way to attack, and can now even flank

effectively, the strategic AI still seems unable to utilise tactics like seaborne landings and assaults. We admit, the period's not known for its naval actions, but it does give a live player a huge advantage, especially when one of the starting position's on an island.

The game's diplomacy angle is also more in-depth, with the ability to not only create alliances and bonds of marriage, but also exchange hostages – family members who will come under the knife should an alliance go south. Too, you can choose to make an enemy clan a vassal when you conquer their last province. On the upside, this means a set income and ally; the downside is that the clan may get uppity, forcing you to conquer that province all over again.

There's no technology tree, as such, but there are various arts you can master to unlock new building options and game bonuses. Cut into two parts, military and social, there's a lot of range to really customise your path to power. You'll also be called upon to make some challenging decisions that can really effect your gameplay. One in particular, about whether or not to allow Christian traders into your domain, is a doozy. Do it, and you get access to fancy



blackpowder units; however, you'll also allow in Christian influence. Religion's one of the most important things to balance in the game, and having Christian neighbours when your people are Bhuddist, or conquering a province with a different faith, is tough. One of the things that Shogun 2 models really well are these bigger picture issues; Japan in this period was undergoing some serious changes, in terms of social upheaval, war, and religious influence.

No DX11?

Here, however, is the rub. Out of the box, if your rig is on the cutting edge – and if you're reading this there's a good chance it is – the game's limited in its graphical punch. It does not yet support DX11 cards, so if that's you, you won't be able to utilise jaggy-killing anti-aliasing. A patch is coming, but it's still disappointing. Shogun 2 also boasts just about the biggest start-up times of any of the series so far. We've also noticed some possible Crossfire related flickering, and the occasional graphics-lock, but at least this last bug can be fixed by Alt-tabbing out and forcing the game to reload.

For all the grandeur of the game, it does seem to have a few rough edges. Nothing game-breaking, of course, and some of them are things that many users will never even notice. And it requires a huge shift in tactical thinking after messing around with Napoleon and Empire before it. But if you can get past all that, Shogun 2's still a mighty effort of a game, showing that Creative Assembly's lost none of its skill in making games designed to suck up most of your life. **DH**



PC

Developer Creative Assembly
Publisher Sega
Website www.totalwar.com/shogun2

Gameplay

Rich, varied, and mostly satisfying.

94

Graphics

Not ideal out of the box, but still impressive.

89

Sound

Battle sounds are wonderfully chaotic, with great voice acting.

92

Overall:
Another great effort, that will only improve.

92%

DVD

Rubber

A potentially decent concept that just falls flat.

Director Quentin Dupieux

Starring Stephen Spinella, Jack Plotnick and Wings Hauser

Distributor Madman

In a nutshell, *Rubber* is the story of a homicidal rubber tyre that goes on a rampage, and the people watching that story unfold. And at this point, you're either completely out or stupidly amused and hoping for a delightfully cheesy and silly romp.

Those in the first camp probably don't need to read any further. We're not about to offer you a bunch of reasons to give this movie a shot, because, quite frankly, there just aren't that many – unless you're an absolute Community completist and must catch Fat Neil's ten minutes on screen. Those that fall in the second camp, well, we're here to warn you that, yes, it's cheesy, and yes, it's silly, but it's not nearly as cheesy or as silly as you're probably hoping for, and that you'd probably be better off saving your pennies.

From the outset, *Rubber* goes all out to be weird. And that's fine – weird can work, but here, it's weird for, as the movie so helpfully tells you at the outset, no reason. And weird for no reason really just results in weirdly stupid.

Of course, going off the opening monologue, where we're asked to consider such critical movie questions like 'Why is ET brown?' and 'Why do we never see the people in the Texas Chainsaw Massacre go to the toilet?' with the answer being a helpful 'no reason', it seems the senselessness is the whole point of this exercise. It's actually almost a clever cop-out; in the same way that any big *Inception* fan will quash your nitpickery with 'it's a dream, it doesn't have to make sense', any question you have about what goes on in *Rubber* can



be answered with a slightly condescending 'no reason'. And that just lets the writers get away with being really, really lazy. They no longer have to explain why there are a dozen people gathered in the desert to watch the rubber tyre go mad, or why the people who gathered there then try to kill them, or what happens to the son of the hotel owner in the end, or, for that matter, why someone would throw out what looks to be a perfectly serviceable rubber tyre.

Of course, no-one expects a movie about a homicidal rubber tyre to make much sense. But plenty of movies start off with a nonsensical premise but manage to infuse it with enough story and character and internal structure to make it work. Here, there's just weirdness piled onto weirdness piled onto pointlessness, all for – say it with me folks – no reason.

And that, given the overall subject matter, would actually be okay if the story of the tyre was in any way actually entertaining, but it's just not. It's slow and lumbering and disjointed and doesn't actually go anywhere. Aside from the odd line or visual, it's also not funny. And as a shock-horror-suspense effort, it's neither shocky, horrifying or suspenseful enough. Sure, the tyre's killing spree starts off fun enough, but it gets much too old, much, much too fast – and yet, it's still annoying when the movie just skips over most of it to get to the end.

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Lord of the Ring fans rejoice! The

series is finally coming to Blu-Ray in a 15-disc set that will take you a couple of days of hardcore watching to get through (and that's without rewatching the movies themselves). June 29 is your magic date, but start saving now.

Terry Pratchett's Discworld books have

been picked up for adaptation into a crime-of-the-week TV series. Thankfully, the team involved are British and thus we're hopeful it will be great instead of, well, terribly disappointing.

Darren Aronofsky has pulled out The

Wolverine, amid fears about the nuclear situation in Japan. That leaves the movie in a little bit of strife, and fans a little bit less hopeful for a successful reboot, but all we can really do is wait and see, isn't it?



For a movie with a run-time of less than an hour and a half, *Rubber* just feels too long, too laboured and too padded. The actual tyre story doesn't take up that much time, and keeps being interrupted by the story of the people watching it, and the people controlling them, but none of them are actually interesting enough to latch onto or care about. It just feels too much like a potentially decent short stretched out into a flabby feature film.

All-in-all, *Rubber* just isn't any good, but it's not bad enough to fall into that awesome so-bad-it's-good place. It's just a boring waste of time that tries much, much too hard to be clever and fails in the dullest way possible. **EG**



Overall

This is one flat, wobbly tyre, and not in a good way.

55%



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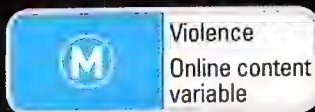
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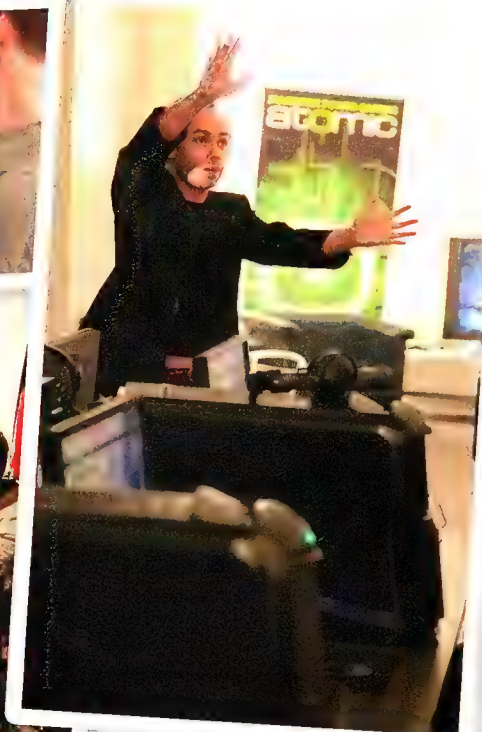


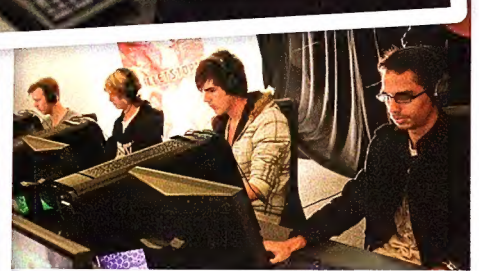
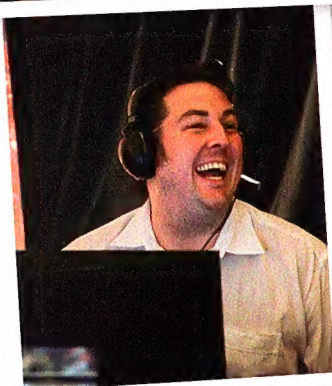
Bulletstorm LAN night

Check out all the fun of our exclusive Bulletstorm LAN, and get a peak at Atomic's exciting new Gaming Lab!

There's few things more beautiful than listening to a room full of gamers gleefully yelling, nay, demanding, double penetration. But that's exactly what we had at Atomic HQ in February, when we hosted a LAN night for EA's latest shooter, Bulletstorm.

To say Bulletstorm's over the top, and even more so in its co-op multiplayer mode, is an understatement. Watching a room of





Atomicans slowly get to grips with the points-scoring hyper-violence of the game was a mess of fun.

So huge thanks to EA for partnering with us on the event, Alienware for kitting out our new Game Lab, and thanks to everyone (especially Team Headbutt, the highest scoring team on the night) for coming along. (P)



The List

Ben Mansill and the art of intending to play everything.

Those of a rigid, orderly mind keep lists. The rest of us get about half the things done we would like, and are generally not too bothered about that, save for a hint of pervasive, overhanging guilt.

In times of great game bounty, such as like we're experiencing, keeping a list of games one means to play is actually quite helpful. The necessity is clear: so many games, such little time, and the very real hope that the gush of games will keep on coming without relent.

In the real world it's a little lumpier than that. We have short, intense bursts with many, many good and great games landing upon us in quick succession, followed by long spans of silence. That's when we fawn over crappy boring games and pine for another golden time.

Well we're in the middle of a golden time right now. It's across every platform and genre, spoiling us with choice. Now, some of us can afford the time and money to play everything they like. These kinds are able to efficiently eat through games as they're released, finishing one in a couple of days, then gobbling down

After straight away bagging the idea for an Atomic column, I thought to myself 'am I just lazy? Do I not love thee, thy games? Why isn't my list actually working?'

Well as it turns out, there are more reasons for not playing a game than for actually playing it. Number 1 of course is that you're just too tied up in one, single, amazing awesome game, so that when you're not playing it, you're dreaming about it. This game precludes all others, but most importantly, it delays them. This is when the list starts to die. The longer a game stays on the list, the less of a chance it'll ever have of getting a decent play.

If I'm really worried a game will disappear that I really do mean to play, I'll fire it up for a controlled conditions 30 minute 'check it out' burst. A 'first look', all designed to fuel the fortitude that's waning. That worked for Red Dead Redemption, which I still haven't played for longer than that quick trial run, but will one day. It worked against Just Cause 2, which didn't turn out to be my cup of tea, so I was able to scratch that.

I do wish I could play them all, but fear I'll only eventually tick off half the games I've written down...

another, or getting unfairly better at multi if the plate's empty.

The rest of us must carefully portion gaming time and gaming money. Balancing it with work, physical activity, important real people and especially loved real people, it's a constant tug of choice that's rarely adequately satiated. And so, sadly, some games start to slip away, pulled by time away from our box.

Thus, we resort to that last desperate foothold of hope, the one true proof that we haven't totally given up, and that we really do recognise a glimmer of expectation that something unlikely will actually come to pass: the list.

I mentioned to Ashton a couple of weeks ago, during a quite nice junket poolside chat, that the number of games I'm actually playing is outnumbered by games I'm not. I added that I do wish I could play them all, but fear I'll only eventually tick off half the games I've written down, all the while adding new games and compounding the problem. Ash responded with a manly eureka shriek, acknowledging that he, too, faced an identical dilemma, and equally had invested all hope for the future in his own games list.

It's so nice to be able to cross a game off the list, even if it's because it's crap. That's 'List Management'. It's important, else the list becomes a monster that feeds itself until it's of no practical use.

The list has stayers, long-term residents that are played, but for one reason or another warrant a revisit. Oblivion and Fallout 3 were like that, except they appeared on the list with a big column of subsections that included all the mods and addons that I really really wanted to give a proper whirl, one day. Right now Fallout: New Vegas is shaping up the same way.

There have been many lists over the years. Ideally, they cycle through growth in boom times, then shrunk through Times of No Good Games. This is the list functioning properly, serving a purpose, with me eventually playing what's on it.

Lamentably, and I do, entire lists have been deleted in one purging swoop. These are known as 'Time To Start A New List Moments'. Now is not the time for that, though. Now is a time for list prosperity. To play a choice couple of games at a time, hard and thoroughly, and to relax in the knowledge that the list will take care of the future.



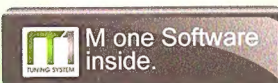


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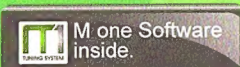
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